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[OFFICIAL NOTICE.]

Wrinkle Department, Western Gas Association.

WESTERN GAS ASSOCIATION,
OFFICE OF THE WRINKLE DEPARTMENT,
721 Citizens Building, Cleveland, O.

To the Members of the Western Gas Association: The Wrinkle Department is now ready to receive contributions for the 1903 collection, and I would thank you to please send a sketch or description of any new device or method you may have to the above address.

Any sketch, photograph or drawing, accompanied by a written explanation, of a new idea will be gratefully received, and it is hoped that you will comply promptly by favoring us with a contribution.

Respectfully, W. E. STEINWEDELL,
Editor Wrinkle Department.

BRIEFLY TOLD.

NINETEENTH ANNUAL MEETING, OHIO GAS LIGHT ASSOCIATION.—Last week, owing to some tangle in the dispatches from Cincinnati, respecting the Nineteenth Annual Meeting of the Ohio Gas Light Association, which was brought off at the Grand Hotel, Cincinnati, Wednesday, Thursday and Friday, March 18 to 20, we were obliged to end our report thereof at the point marking the conclusion of the proceedings of the first day. The finish of the story, even though it does seem a trifle late, is appended. The theater outing on the evening of the first day—a visit to the Grand Opera House, with Julia Marlowe in "The Cavalier" as the attraction—due to the courtesy of the Cincinnati Gas and Electric Company—was very much enjoyed. The weather on Thursday (the second day) was as it is in May. A feature of the attendance was the appearance of General Andrew Hickenlooper at the sessions. He has not grown any taller, but the breadth of the welcome that he got must have reassured him, if such assurance were necessary, that he is very much alive in the minds of his contemporaries. The paper, by Mr. Donald McDonald, of Louisville, Ky., on "Domestic Heating by Gas," and the discussion thereon, virtually occupied the attention of the Association during the morning of Thursday. After that came the trip to Hamilton, where the Association was the guest of the Hamilton-Otto Coke Oven Company, with the purpose of inspecting the system of coke ovens there operated by the named concern. The visit was quite an interesting and instructive one, and not the least pleasing feature of it was an excellent luncheon, which was put on the boards by a local firm of gas stove makers. The dinner at the Grand, Thursday evening, was an elaborate and thoroughly enjoyable affair. "Suburban and Urban" Shelton was toastmaster, and some of his "roasts" were "done quite brown." Friday, the last day, was quite a busy one. The matters disposed of were: The Novelty Advertising Department, which made an excellent showing under the guiding hand of Editor Perkins; the report of the committee on standard methods of testing fuel gas appliances, by Mr. H. L. Doherty; the "Progress Department," by Editor Butterworth, whose work evidently had been much and varied, and several routine matters of business. Of course, the "Question Box" as loaded by Custodian Doherty, was a feature of the meeting at almost every stage. In fact, if anything, there was too much of it. That set of questions and answers would look well in binding. Cleveland was chosen as the next place of meeting, and the officers elected were:

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President—John D. McIlhenny, Philadelphia, Pa.
Vice-President—F. W. Stone, Ashtabula, O.
Secretary and Treasurer—T. C. Jones, Delaware, O.
Executive Committee—C. W. Andrews, John Franklin, C. A. Schwarm, Donald McDonald and J. D. Shattuck.

The attendance was excellent, and the members stuck well to business. All were satisfied at the outlook for trading, and the manufacturing end of the fraternity was dilating its eyes over contracts on construction account that were past the planning stage. Rumors of changes to come in the staffs of some of the largest companies in the country were plentiful, some of which are really of an amazing nature. The meeting was a complete success.

NOTES.—

IN response to many inquiries made of us as to the personnel of the executive management of the Consolidated Gas Company, of New York, we herewith give the complete list:

President—H. E. Gawtry.
Vice-Presidents—Samuel F. Sloan, Walter R. Addicks, Louis B. Gawtry.
Treasurer—James A. Bennett.
Assistant Treasurer—Benjamin Whitely.
Secretary—Robert A. Carter.
Assistant Secretary—C. C. Simpson.

WE understand that Mr. W. A. Baehr, of Denver, Col., will resign from the service of the Denver (Col.) Gas and Electric Company to assume the engineering management of the works of the Laclede Gas Light Company, St. Louis, Mo. This is not official.

MAJOR URQUHART, of Toronto, according to a correspondent, who writes under date of the 20th inst., made a proposition on the 16th inst., to the Board of Control looking to the purchase by the city of the properties of the Consumers Gas Company with a view to operating the same on public account. In introducing the subject he presented a long and somewhat wearisome history of the Gas Company's dealings with the city since the passing of the Act of 1837. He submitted a statement to the effect that in 1902 the average market price of gas stock was 213½, and from the year 1898 until 1903 there were 3,308 shares sold at prices exceeding 214. The Mayor recommended that the city offer to purchase all the stock at 214, and to provide $10,170 to reimburse all those persons who had bought stock at a higher figure than 214. The total cost of the plant would be at this rating $3,755,170, and the Mayor believed that the city could run the plant so that gas could be supplied to the citizens at 60 cents per 1,000 feet, the revenue being sufficient at that rate to pay the interest and sinking fund on the investment, and provide a handsome surplus after paying all expenses. Controller Richardson was in favor of submitting a by-law to the people immediately, but Controller Burns was not certain whether, in view of the early supply of electric energy from Niagara Falls, the purchase of the gas plant would be advisable. There was practically no discussion on the question, and by unanimous consent the matter was laid over, and will be considered at the next meeting of the Board.

THE Board of Directors of the Cincinnati Gas and Electric Company have decided to increase the capital stock in the sum of $1,000,000. The proposition will be presented to the shareholders for ratification at the annual meeting of the Company, which is to take place May 4th. The new stock will be sold by the Company in the open market from time to time, or as the money is needed to pay for betterments on the plant.

THE Natchez (Miss.) Electric Street Railway and Power Company and the Southern Light and Traction Company, of the same city (both concerns are in the control of the same parties) have issued a new schedule of selling rates, which schedule virtually amounts to an increase of 12½ per cent. over the former rates: Electric current, 15 cents per 1,000 watts; less 10 per cent. for prompt payment. Gas on illuminating account, $2 per 1,000; for fuel use, $1.75 per 1,000, less 25 cents per 1,000 all round for prompt payment.

THE Montreal (Can.) Company has planned for the construction of a new holder up to retaining 3,000,000 cubic feet. It is to be located in what is known as the Hochelaga district, and the agreement is that it will be completed by November 1st.

THE new plant at Whittier, Cal., is in successful operation.

MR. M. NISBET LATTA, Superintendent of the Charlotte (N. C.) Gas Light Company, is making arrangements to double the capacity of the plant during the coming summer. The development of the gas business in Charlotte during the past three years has been of the rapid sort, and Mr. Latta means that further growth is not to be handicapped through lack of apparatus, either of the manufacturing or distributing kinds.

[OFFICIAL REPORT—REVISED BY THE SECRETARY.—CONTINUED FROM PAGE 449]

THIRTY-THIRD ANNUAL MEETING OF THE NEW ENGLAND ASSOCIATION OF GAS ENGINEERS.

HELD IN YOUNG'S HOTEL, BOSTON, MASS., FEB. 18 AND 19, 1903.

FIRST DAY, FEB. 18—AFTERNOON SESSION.

Question Box Discussion Continued.

The President—We have an allied question here. It is:

"At what point in the works should coal gas and water gas be mixed?"

Will those who run combined plants briefly state just where they mix the gases? Mr. Barnum, where do you mix the coal and the water gas?

Mr. Barnum—At the inlet of the exhauster.

The President—Mr. Learned?

Mr. W. A. Learned—At the inlet of the purifiers; but hereafter it will go into the hydraulic main at a temperature of 130° or 140° and both mix together there.

The President—The proposed change there is more like your system, Mr. Barnum.

Mr. Allyn—We mix ours at the inlet of the purifier.

Mr. Sherman—We mix our coal and water gas at the outlet of the purifier. We have two separate sets, one for water gas and one for coal gas.

Mr. Africa—At the inlet of the purifiers.

Mr. Hintze—And we do the same.

Mr. McGregor—Likewise.

Mr. Barnum—In connection with this it is well to ask, in considering the mixture of the two gases, do they run them both at the same temperature, or, as is the case with Mr. Sherman, where he has two separate works, do they condense the coal gas at a lower temperature than the water gas? In our plant we condense the two together; the crude water gas comes from the relief holder and the coal gas comes about 250 feet from the retort stack. The carburetted water gas first goes through small condensers and leaves them at 140°, then it passes through larger condensers, and the outlet temperature is held between 100° and 110°. From here the gas goes to the relief holder, then to the meter and finally to the inlet of the exhausters, where it meets the coal gas from the retorts. The water gas enters the exhausters at a temperature of 75°, and the temperature of the coal gas is 125°. Mixing about half-and-half, the resulting temperature will be, of course, about 100° at the outlet of the exhausters. The gas then goes through very large air condensers, and at the outlet of the condensers the temperature is held between 75° and 80°. It then goes through a single seal, tar extractor, and the temperature remains between 75° and 80°. From the extractor it goes through the scrubbers and the temperature still remains 75°; it then enters the purifiers at 75° and leaves at 80° or more. From the purifiers it goes to the meter and is measured at a temperature of from 67° to 70°. It then goes to the holder, and it is difficult to say just what the temperature is at this point. The water at the top of the tank remains between 55° and 60°. It passes the governor at between 52° and 60°. Our object is, in mixing the two gases in this manner, to take out the heavy tar while it is hot and to have the two gases mix together at such a time that the vapors in the coal gas that are not in the water gas, and which the water gas can absorb, and the vapors in the water gas, of which there are none in the coal gas, and which the coal gas can absorb, will be taken up by the respective gases. The advantages we think are as follows: A quantity of vaporsis absorbed and carried by the mixed gas that would otherwise be lost; the resultant vapor tension is much higher, and a larger amount of hydrocarbons is carried in the gas, both in the form of gas as well as in the form of vapor. This results in higher candle power. It also gives more vapors for dissolving naphthaline, and, again, the higher vapor tension will carry further in the distributing system. The disadvantages are that you must have rather larger apparatus, especially scrubbers. You must have in either case about the same amount of condensing apparatus, and the tar extracting apparatus will be about the same. In the case of coal gas you will have a Walker tar extractor, and for water gas some form of sawdust scrubber, especially if your connections are not large and long. The purifiers should be about the same. It, therefore, is evident that the scrubbers only must be larger when the two gases are cleansed together. The real disadvantage that comes in the scrubbing process is that we do not get such strong liquid for shipping which results in larger freight bills; we get just as many gallon-ounces. We obtain over 220 per ton of coal, and I believe 240 is the limit. Another disadvantage

might occur if all the tar were not taken out before it reached the purifying material. The efficiency of our oxide does not show that it is affected in the least. We purify about 150,000 to the bushel. It cannot be expected that a plant designed to take care of one million of coal gas, will take care of one million of coal gas with one million of water gas added to it; the apparatus must be as large as would be designed for two million of coal gas, and must have large connections throughout. There is a great deal of prejudice against running the two gases together, which is probably due to engineers having been forced to do this very thing. To determine the advantage gained in candle power from running in this manner is an exceedingly hard problem. Shall we test the 16-candle power coal gas, the 20-candle power mixed gas and the 24-candle power water gas all with the same burner, or shall we use different ones? The difference in efficiency of the burners might be more than the difference between the actual value of the gases. In testing these 3 gases we get the most satisfactory results by using an Argand burner and adjusting the flame to give the best efficiency, and then correct to 5 cubic feet per hour. Dr. Love has determined, I believe, that a coal gas and a carburetted water gas mixed cold, after being purified separately, gains ½ candle, due probably to a better ratio between the hydrocarbons and the diluent gases. Our results in general show an increase of 1½ candles in the mixed gas above what it should be, if figured from the proportional condle powers, which would show one candle gained by mixing hot over and above the ½ candle gained by mixing cold.

Mr. Leonard—How does Mr. Barnum raise the temperature of gas that passes through the purifiers?

Mr. Barnum—All our exhaust steam from 5 engines and 2 pumps passes through the cellar of the purifying house and the pipes are coiled round the bottoms of the boxes. Besides that, we also have live steam pipes; in extra cold weather we turn live steam into the house. It is simply by having a lot of steam and keeping the boxes very warm.

Mr. Leonard—Do you turn the steam directly into the boxes?

Mr. Barnum—No; not into the boxes. We do it the same as you would heat any building.

Mr. Leonard—You don't turn the steam into the gas at all?

Mr. Barnum—No; no connection.

Mr. W. A. Learned—I should like to ask Mr. Barnum in regard to his temperatures where the water and the coal gas are mixed at the exhauster.

Mr. Barnum—What they are when they enter?

Mr. W. A. Learned—Yes. What are they?

Mr. Barnum—The water gas coming from the holder is about 70° to 75°. It is metered between the relief holder and the exhausters. The coal gas is about 125° coming from the stack, about 150 feet away.

Mr. W. A. Learned—As I previously told you, we are about to put 40 per cent. of water gas into the hydraulic main. The temperature of the water gas will be in the neighborhood of 130° or 140°, and that will be the same temperature as the coal gas at that point. In regard to heating the gas in the purifying house, instead of heating the house itself we enlarge the inlet pipe to the purifier; in other words, we put a heater in the inlet pipe and charge it with exhaust steam. That brings the temperature of our gas at the inlet of the No. 1 purifier to 100° or 105°. We find that is better; no, I won't say better, but easier to do than to heat the whole purifying house.

The President—I think the members have answered also another question which was asked here:

> "Does a mixture of coal gas and water gas give a higher candle power than would be computed from the known proportions and candle powers of the component gases?"

Mr. Barnum stated that this system of mixing gave him, as I understood it, 1 to 1½ candles more than would be expected by a proportional computation. Another question which deals directly with this general subject of condensation is:

> "What results have been obtained from a P. & A. tar extractor for a coal gas works of 80,000 to 100,000 daily capacity?"

Has anyone had experience with that particular size of P. & A. tar extractor? How many members in the room have P. & A.'s in service doing good work? They will please raise their hands. There are three hands raised. The gentleman who asked the question is here. He knows that the P. & A. is doing the work for which it is designed. How many have the P. & A. in service and not doing satisfactory work? It seems to do all right.

The Secretary—Mr. President, before that question is dropped, I would like to inquire of some of these gentlemen who have so carefully noted their temperatures, and especially those who have P. & A. condensers, whether they have found that, when the temperature ran above 110°, there was any disadvantage in the higher temperature.

Mr. McGregor—No, I would reply that we never found any disadvantage if we did not run higher; but of course we found that the best practice was to keep the gas at about 110°.

The Secretary—Not below that?

Mr. McGregor—Not below that. In that way, in testing out for tar, we found very little tar on the other side of the P. & A. extractor.

Mr. Nettleton—I would like to ask Mr. McGregor if he uses the P. & A. on water gas.

Mr. McGregor—On coal gas simply.

Mr. Nettleton—Then I should like to ask him if he has had any trouble from naphthaline in connection with it. When the P. & A. condensers were first introduced, I think almost everybody that put them in had a great deal of trouble from naphthaline, and judging by the reports that have come to us from England they believe it is now due to the fact that the tar was removed and it did not have a chance to absorb the naphthaline out of the gas. There was a paper read recently in England in which it was proposed to put some of this tar back into the gas—not in the vapor, but in a stream—let it go running through a series of pipes, for the purpose of absorbing the naphthaline. I would like to ask Mr. McGregor if he has had any trouble from that source?

Mr. McGregor—We have had this apparatus in use about a month, and I presume the P. & A. is on very good behavior. I can tell Mr. Nettleton a year hence very much better whether we are encountering troubles and difficulties such as he has outlined.

Mr. Allyn—I will state that I have a beautiful P. & A., nearly as high as this room, that I have not been able to use as yet, because it is not connected at either end. I hope to be able to do so the coming year.

A Presentation by Mr. Egner.

The President—I would like to interrupt the ordinary course of business to make a statement, by reading this note from Mr. Frederic Egner which has been handed to me:

To the New England Association of Gas Engineers: In memory of pleasant reunions with the New England Association of Gas Engineers, I donate to its proposed library the following books:

"The Relations of Municipalities to Incorporated Companies;" 3 vols., by A. R. Foote.

"The Guide Framing of Gasholders, and Strains in Structures Connected with Gas Works;" by Mr. F. Southwell Cripps. One vol.

"A Treatise on Masonry Construction;" by Mr. Ira O. Baker, 6th edition. One vol.

"A Handbook of Industrial Organic Chemistry;" by Samuel P. Sadtler, Ph.D. One vol.

"Encyclopædia of Chemistry. Theoretical, Practical and Analytical;" by Writers of Eminence. (Lippincott's Pub.). Two vols.

A Copy of "Field's Analysis of the Accounts of the Principal Gas Undertakings in England, Ireland and Scotland;" pamphlet form.

"The Standard Electrical Dictionary;" by T. O'Conor Sloane, M.A., etc. One vol.

"A Treatise on the Distillation of Coal Tar and Ammoniacal Liquor, and the Separation from Them of Valuable Products;" by George Lunge, Ph.D., F.C.S., etc. One vol.

"Keister's Corporation Accounting and Auditing. Designed for the Use of Bookkeepers, Accountants, Financial Experts, Business Men, Investors, Stockholders, Corporation Officers and Lawyers;" by Mr. D. A. Keister. (Seventh edition.) One vol.

"Roof Trusses. (Revised Edition.) Graphical Analysis of Roof Trusses;" by Charles E. Greene, A.M., C.E. One vol.

"Gas Works: Their Arrangement, Construction, Plant and Machinery;" by Frederick Colyer, C.E. One vol.

"The Economical Gas Apparatus Construction Company's Illustrated Catalogue." One vol.

"The Lowe Standard Water Gas Apparatus;" by the United Gas Improvement Company.

The Secretary—Mr. President, I move that this contribution to our proposed library be accepted, with the sincere thanks of the Association to the man whom I am sure we each and all individually regard as one of our very best friends.

Mr. Africa—I am pleased to second that motion, Mr. President. [Adopted.]

The President—Mr. Egner, you have the hearty thanks of the Association.

There is I think time to discuss one more of the remaining questions. For instance—

"What results have been obtained with 'gas oil' in fixing retorts?"

We have had such capital replies to all these questions that I hope you will keep up the good work. I know Mr. Cooper will say a little. He has not had success, I think.

Mr. Cooper—No success.

The President—How many are using gas oil in retorts with entire satisfaction? Will they please raise their hands? How many are using cannel with entire satisfaction? How many are using gas oil without entire satisfaction in retorts? (Laughter.) Mr. Allyn, yours is not coal gas.

The Secretary—I suppose that the intent of this question was, in water gas process, not fixing the retorts, but fixing the oil vapors and mixing them with water gas for enrichers, rather than their use for enriching coal gas. I do not now recall who sent in the question.

The President—That is a new interpretation of the question. The only gentleman who mentioned Wilkinson retorts said that he was not using gas oil satisfactorily, so I suppose his results are not worth being disturbed about.

Mr. Fowler—Mr. President, I beg to differ.

The President—There is one more question. It is:

"What results have been obtained from the new generator fuels used because of the coal strike?"

Mr. Barnum—We have only tried one other fuel besides coke made from good coal. We tried petroleum coke. The difficulty we had—we were running up and down steam at that time—was that when it gets incandescent it flies off in particles about the size of a pea, and with a very strong blast those particles are carried over into the water-cooled valve and also the valve at the bottom, and when you come to shut the valve it does not close. That is the trouble we had with the petroleum coke, so much so that we only used a very small proportion of it mixed with regular coke. I imagine it would work all right in a set without up and down steam. Some companies I know have used it with great success.

Mr. Leonard—We got a cargo, and found we had to screen almost all and could use only about 60 per cent. of it; the remainder had to be used under the boilers. I found that in a given time it would make about 67 per cent. as much gas as Buck Mountain anthracite, including the time for cleansing. It does not ignite as freely as Pennsylvania anthracite, and as a result it is necessary to have shorter runs. Also, it does not clinker as hard.

Mr. Allen—We bought some Welsh anthracite, and started in to use about 30 per cent. without screening it, mixing it with American anthracite. We tried 50 per cent., but found we would be obliged to screen it. We are now using about 50 per cent. of Welsh anthracite, screened. The fine coal we use under our boilers, mixing it with other coal. We get the best results in that way.

The President—We found that, using Welsh anthracite mixed half-and-half with American anthracite, we did very well.

Mr. Allen—Without screening.

The President—Taking the lump. When we took more than 50 per cent. we were not so well satisfied. In the case of retort coke that had been handled four times before it was put into the generator (making the fifth time when it was thrown in), having a large percentage of breeze and dust, we found that for a given weight delivered we could get 75 per cent. of the gas that the same weight of clean anthracite would give us out of the apparatus. The coke was not all used in the generators. The rest of the coke would have to go to the boilers.

The Secretary—I used about 20 tons, and found it was an excellent fuel. I cannot give exact figures, because I was not in position to make close tests; but it was all right.

The President—In connection with this subject of petroleum coke I received a letter from Mr. E. G. Jones, who is a member of the Association, now resident in California. He says that petroleum coke is claiming a good deal of his attention, and that he has succeeded in producing a hard metallurgical coke as a bi-product, which contains only 1½ per cent. ash and no sulphur. That ought to be pretty good material for making gas. The hour for reassembling to-morrow morning is 10 o'clock. We have two papers of importance to discuss at that time, and I hope members will be prompt.

On motion the Association adjourned, to reconvene at 10 A.M. the following day.

SECOND DAY—THURSDAY, FEB. 19.—MORNING SESSION.

The Association met pursuant to adjournment. A special report from the Board of Directors, relating to the election of some belated applications for membership, having been favorably acted upon, the President announced that the Association would listen to the paper, by Mr. A. B. Tenney, of Revere, Mass., on

THE DEVELOPMENT OF THE GAS DISTRIBUTING SYSTEM OF THE SUBURBAN GAS AND ELECTRIC COMPANY IN REVERE AND WINTHROP, MASS.,

which was as follows:

In the early part of 1901, franchises to sell gas in the towns of Revere and Winthrop were granted to the Suburban Gas and Electric Company. In years previous various attempts had been made by local parties in both towns to obtain franchises, but as these attempts did not not result in any form, the field opened up by these franchises was free from competition and offered to the promoters an excellent chance to see what could be done.

The combined population at this time was about 16,000; 10,000 in Revere and 6,000 in Winthrop. These figures are greater during the summer months, and the combined population in July and August could be safely placed at 22,000.

The property of the Suburban Gas and Electric Company is located on Chelsea Creek, Revere, directly adjoining the depot and freight yard of the Eastern Division of the Boston and Maine Railroad, and is thus amply provided with good means for obtaining coal and necessary articles of manufacture at the lowest possible prices. Plenty of land for buildings is available; thus the location offered excellent opportunities for the construction of a gas plant, but after carefully considering all these points, together with other available sources of supply, it was finally decided to abandon the manufacture of gas for the present and to purchase same of a neighboring company for a term of years, and thus merely maintain a distributing system.

The Company agreed with the local authorities to lay a maximum of 17 miles of pipe, 6 miles in Revere and 11 miles in Winthrop, before July, 1902; to sell gas at $1.20 net per 1,000 cubic feet, and to reduce this price to $1.15 per 1,000 cubic feet in about 18 months after the granting of the franchises; also, to reduce the price of gas to $1 per 1,000 cubic feet as soon as the average consumption per capita became equal to that in the State of Massachusetts.

One other condition imposed upon the Company by the Revere authorities was that citizens should be hired when possible to do the work of construction, and that they should be paid at the rate of 25 cents an hour, a most unreasonable price for labor of this nature. In order to induce the people to use gas the Company offered to lay services, not exceeding 50 feet, to set meters and connect same to gas ranges or lighting systems free of charge.

With these conditions in view, work began on April 18, 1901, and by November 16, 1902, the Company had laid $3\frac{1}{10}$ miles of 10-inch pipe, $1\frac{94}{100}$ of 8-inch pipe, $4\frac{446}{100}$ of 6-inch pipe, $8\frac{84}{100}$ of 4-inch pipe, $\frac{87}{100}$ of 2-inch pipe; or a total of $18\frac{63}{100}$ miles. As will be seen by the above figures, our mains were of ample capacity, nothing less than 4-inch being used, except in a very small amount of 2-inch pipe which seemed advisable in a few cases. The cast iron pipe was of the standard U. G. I. specifications for cement joints, weighing 610 pounds per length of 10-inch pipe; 492 pounds per length of 8-inch pipe; 365 pounds per length of 6-inch pipe; 228 pounds per length of 4-inch pipe; only about 1,200 feet of lead joint pipe being used.

During the period of construction the Company engaged the services of an experienced gas engineer and made a house-to-house canvas of the streets along which we were to lay our mains, and a very careful record of house, owner, tenant, whether the house was wired or piped, whether using electricity or not, whether gas was wanted, was obtained, and, by means of a card catalogue, a very valuable and complete report was obtained of each possible customer. The number of houses visited and the results obtained are shown in the following table:

Town.	Light Used. Elec.	Light Used. Oil.	Wired for Elec.	Piped for Gas.	For Both.	Favorable to Gas.	Contracts Signed.	Total Houses and Stores Visited.
Revere	62	627	234	94	42	348	...	689
Beachmont...	71	271	121	17	7	286	...	342
Revere Totals	133	898	355	111	49	634	150	1,031
Winthrop ...	408	787	561	115	84	842	185	1,195
Grand Totals	541	1685	916	226	133	1476	335	2,226

Gas was turned on to the mains November 2, 1901, and after the

mains had been carefully blown out and tested, the commercial sale of gas began about November 24 of the same year. At this time we had laid about 400 1¼-inch services, and had over 100 customers connected, ready to use gas.

As stated before, we were obliged to hire Revere citizens when available for the work in Revere and pay them 25 cents per hour for their services, while in Winthrop we were free to hire our labor as we pleased. There were three methods of carrying on the work of construction: First, contract; second, percentage basis; third, to do the work ourselves. Each method was open to serious objections, the least objectionable one being the percentage basis, and we finally agreed with two contractors to do the work on this basis, paying them 15 per cent. on their pay rolls and money expended in maintaining the tools, etc.

The results obtained by this method are shown in the accompanying table. The conditions under which the two contractors worked were identically the same except for the labor performed on the 3-inch pipe, in which case the section constructed by B ran so close to the street railroad track that it was necessary to remove the brow and brace the ditch to prevent the tracks from falling in. This, of course, increased the cost over the ordinary.

	10-Inch.	8-Inch.	6-Inch.
Revere .....A	.9787	.7685	.6252
" .....B	1.004	.9216	.6853

The nature of the soil in the two towns varied greatly. In Revere we were troubled with street cars for a larger part of the distance, while in Winthrop we had none. The soil in Revere was very hard and a large amount of beach stone was encountered. In Winthrop a major part of the digging was in fine, hard sand, and in only one section, namely, the Ocean Spray, were we troubled with running sand and gravel. In this locality the sand was so lively that at times we were obliged to dig our ditch at least 7 feet wide at the top, or else drive sheating, which at times was preferable.

The minimum depth of cover on top of the pipe was maintained as near to $3\frac{5}{10}$ feet as possible, and the average width of the trench was 30 inches. But few gates were used, and then only to divide the system into sections for fire purposes; where bridges were crossed, gates were placed on either side, only 26 gates being installed, 9 of which were at bridges.

We were greatly disappointed not to have been able to sell gas during the summer of 1901, but the large amount of work and consequent delays prevented it. In the spring of 1902, however, we were ready for the summer business; and during June, July, August, and September, our output reached as high as 1,782,000 feet of gas; and in January of 1903, although having lost a large number of summer customers during the month of September, our output was nearly 2,000,000 cubic feet for the month.

Services and mains were laid during the season of 1902, and on January 31, 1903, a total of 995 services had been laid, of which 543 were laid in 1902, 202 in Revere and 341 in Winthrop, with 873 meters set, of which 479 were regular and 394 prepay; 687 stoves had been connected, of which the Company had sold 570. During the past winter a large number of heaters and radiators were sold, the exact number of which, however, we were not able to obtain. The total number of miles of main laid up to this date is as follows: 3.10 miles of 10-inch; 1.96 miles of 8-inch; 5.04 miles of 6-inch; 13:10 miles of 4-inch; .52 miles of 2-inch; or a total of 22.74 miles.

Although the sale of gas was commenced in November, 1901, yet we hardly began the sale of same until January, 1902, and it may be of interest to note the monthly output from January, 1902, to January, 1903, showing how the business has increased. But little gas was sold during November and December of 1901, yet I think it well to show here the output for every month up to and including January, 1903:

November, 1901	136,277
December, 1901	306,366
January, 1902	288,496
February, 1902	288,260
March, 1902	296,702
April, 1902	335,249
May, 1902	503,964
June, 1902	875,926
July, 1902	1,397,459
August, 1902	1,782,011
September, 1902	1,619,706
October, 1902	1,622,678
November, 1902	1,551,722
December, 1902	2,010,061
January, 1903	1,808,981

The cost of laying the pipes, including teaming, labor at the various rates, including 15 per cent. commission, but not including the cost of yarn and cement, is shown by the following table:

REVERE.

Size.	Wt. Per Length.	Wt. Per Foot.	Cost Per Ton.	Cost Per Pound.			Cost Per Foot Laid.			
				Pipe.	Teaming.	Total Del'd.	Cost Pipe Ft. Del'd.	Labor 35c.	Contract 15 per Cent.	Total.
10"	670	55.8	$22	.011	.0005	.0115	.6417	.3776	.0566	1.0923
8"	492	41.0	"	"	"	"	.4715	.3940	.0591	.9246
6"	365	30.4	"	"	"	"	.3496	.3208	.0481	.7185
4"	228	19.0	"	"	"	"	.2185	.2487	.0373	.5045

WINTHROP.

Size.	Wt. Per Length.	Wt. Per Foot.	Cost Per Ton.	Cost Per Pound.			Cost Per Foot Laid.			
				Pipe.	Teaming.	Total Del'd.	Cost Pipe Ft. Del'd.	Labor 15c.	Contract 15 per Cent.	Total.
10"	670	55.8	$22	.011	.0005	.0115	.6417	.2421	.0363	.9201
8"	492	41.0	"	"	"	"	.4715	.1660	.0249	.6624
6"	365	30.4	"	"	"	"	.3496	.1176	.0177	.4849
4"	228	19.0	"	"	"	"	.2185	.1346	.0202	.3733

The Company was fortunate in obtaining its pipe at a price of $22 per net ton f.o.b. cars Revere. The average cost of the teaming was $1 per ton. The question could be justly asked why the cost of laying the pipe seems high, especially the 4-inch pipe, for which the labor charge is 13½ cents per foot. This is due to the fact that the 4-inch pipe was laid in cross streets, which were, as a rule, about 600 feet long and would not permit of a full day's work for the gang of men employed. Thus, at least an hour, if not more, was lost each day in shifting from one street to another. This price is also influenced by a delay on the part of the teamsters in not having pipe on hand in sufficient quantities to prevent delays. In many instances where we were able to secure a full day on a street we laid 4-inch pipe as low as 6 cents per linear foot.

The average length of our services is 47.16 feet, and cost to lay $10.04, or 21.28 cents per foot. The average cost of setting a meter and connecting a stove was $5.38.

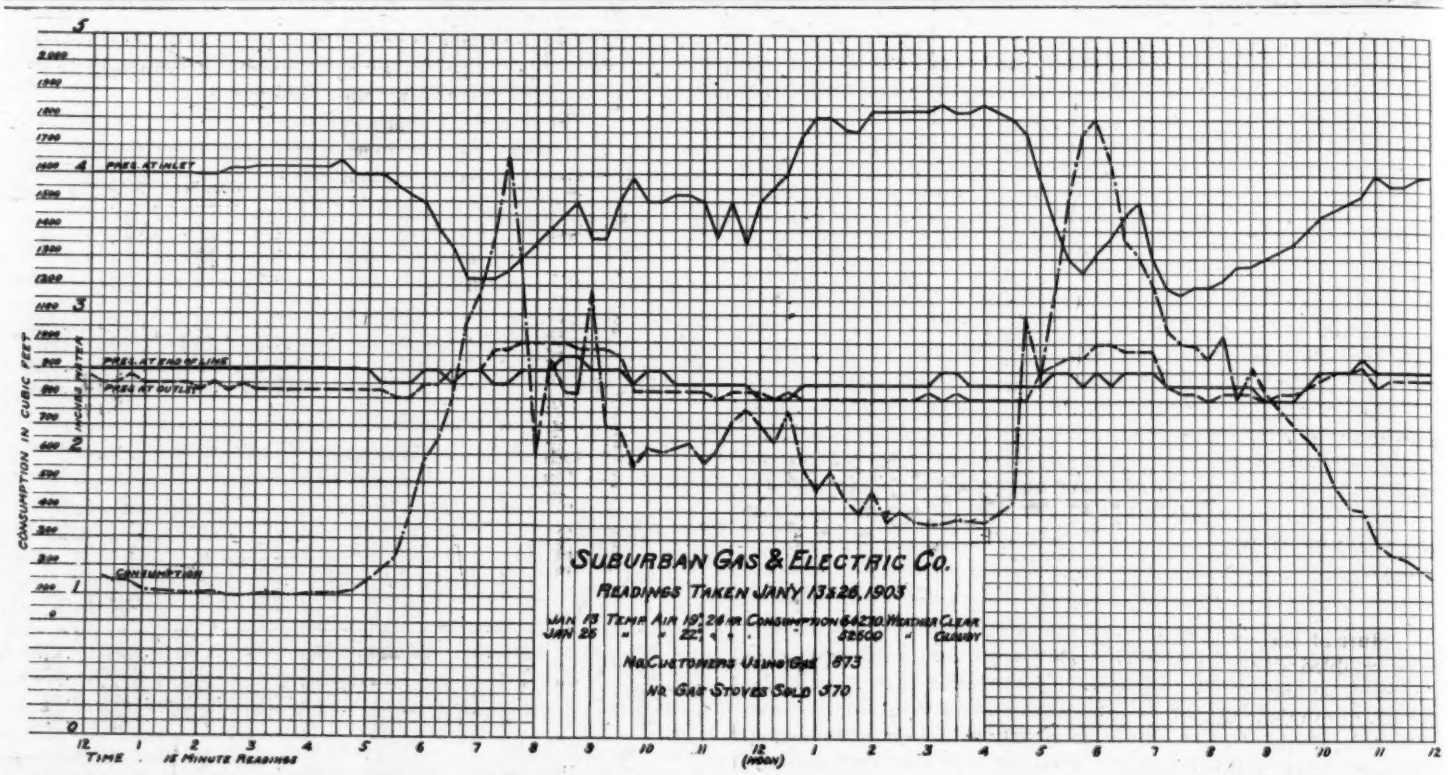
The average cost per mile of main laid was in this case about $4,369 67 per mile, this sum including the building of a piled structure across Belle Isle inlet to carry our main supply pipe.

The following table shows what proportion of the total cost of the plant is represented by the various items which extend into this work.

Tools	0.1 per cent.
Miscellaneous	4.9 "
Pipe	44.04 "
Fittings	.403 "
Labor	34.95 "
Yarn and cement	1.51 "
Teaming	2.75 "
Engineering	3.79 "
Interest	2.92 "

Probably one of the most interesting items in connection with this work is the leakage of the mains. In November, when the sale of gas had commenced, our mains showed a leakage of 480 cubic feet of gas per hour; but by January 1, 1902, this had been reduced to 180 cubic feet of gas per hour. In the summer of 1902, 15-minute readings of our station meter, taken between the hours of 2 and 4 A.M., showed that the leakage or consumption at this time was but 184 cubic feet of gas per hour, or practically the same as in January the same year. This leakage reduced to the basis of a 3-inch pipe gives 17,520 cubic feet of gas per annum per mile of main, which seems to be quite reasonable. The leakage obtained by a comparison of our gross receipts for the month as compared with our output is about 20 per cent., but this is readily explained by the fact that we could do double the amount of business with the mains that we have and thus our percentage of leakage would be reduced in proportion.

Two tests have been made to find how the pressure varied with the consumption, and the resutts of same are shown by the accompanying diagram. The dotted line shows the pressure at the outlet of the governor or the inlet of the mains, and the full line shows the pressure at


CONSUMPTION IN CUBIC FEET
PRESS. AT INLET
PRESS. AT END OF LINE
PRESS. AT OUTLET
CONSUMPTION
SUBURBAN GAS & ELECTRIC CO.
READINGS TAKEN JANY. 13 & 26, 1903
JAN 13 TEMP. AIR 19°, 26 " " CONSUMPTION 64210 WEATHER CLEAR
JAN 26 " " 22° " " " 82500 " CLOUDY
No. CUSTOMERS USING GAS 673
No. GAS STOVES SOLD 370
TIME . 15 MINUTE READINGS
(NOON)

the end of 5.76 miles of pipe, which is made up as follows: 3.1 miles of 10-inch pipe, 1.16 miles of 8-inch pipe, 1.5 miles of 6-inch pipe.

The consumption of gas is shown by the other full line, and it will be interesting to note that two-thirds of the gas is taken in the first 1½ miles of pipe, which will undoubtedly account for the variations in the pressure at the two ends of the mains. There is also some difference in elevation between the two points, probably 10 feet.

During the winter of 1901 and 1902, in order to retain the services of some very efficient men, the Company piped a few houses, and it may be interesting to consider the following table which contains the number of outlets and the actual cost per outlet for doing the work:

	Outlets.	Cost.	Cost for Outlet.
1.....	11	$19.84	$1.80
2.....	13	23.36	1.29
3	15	23.09	1.40
4.....	9	18.35	2.04
5.....	15	35.12	2.34
6.....	21	34.40	1.64
7.....	14	22.12	1.58
8	11	34.78	3.16
	8)109	$211.06	$15.25
	13.6	26.38	1 905

For this work we paid the gasfitter 25 cents per hour, and his helper 15 cents per hour. In soliciting this house piping, we guaranteed the customer that the cost per outlet would not exceed $2.25, providing he would guarantee us at least 10 outlets; and if the cost per outlet, based on the rate of 50 cents an hour for fitter and helper, together with the cost of material, plus 20 per cent. on same, should come to less than $2.25 per outlet, we would give the customer the benefit of the same. In a few instances the cost per outlet came to less than $2.25 and the customer received the benefit of it; but the average selling price per outlet, including repairs which we were obliged to make to the customers' ceilings, brought the average price to $2.35; consequently we were obliged to raise our price to $2.50 per outlet, and then we guaranteed our customers perfect satisfaction in every particular. These costs are based on concealed piping.

In connecting lighting systems we experienced considerable trouble on account of the poor work done in piping these houses, and as plumbers were rapidly becoming gasfitters, we were obliged to protect ourselves in some manner, and we decided to subject every lighting system, as far as possible, to a pressure test; consequently our men were equipped with pressure pumps as used by the city of Boston. Owing to the very poor quality of the work which was being done, we made it a rule that the gas piping should maintain a pressure equal to a column of mercury 8 inches high for a period of 5 minutes, and that fixtures should maintain a pressure equal to a column of mercury 4 inches high for the same period. In this manner we were able to forestall several accidents which certainly would have happened, due to cracked pipe and poor fittings. Of course, this was not pleasing the local fitters, but some idea may be obtained of their ability to do work of this nature from the fact that, in order to find leaks they ingeniously applied a water test to the pipes.

Discussion.

The President—There is a good deal of data in this paper that I hope some of the members will amplify in the case of their own installations. Can any of the members present from Providence give us some information on this subject? Mr. Hutchinson.

Mr. Hutchinson—Never having had anything to do with piping, I cannot give any information on it at all.

The President—The laying of the mains.

Mr. Hutchinson—I never had anything to do with that. It is a separate part of the work.

Mr. Nute—Mr. President, I have not that data at hand. I had not read the paper through to see what was coming up before us. One point though struck me in regard to the cost of this house piping. I would say, although we don't do the house piping ourselves at all, that there has been during the past 2 years probably an average of 1,000 or 1,500 old tenements per year piped in Fall River, the work being done by the gasfitters there. Their charge for this work is $2 an outlet for concealed work, where they have 4 or more outlets. Where, as they frequently do, they go into a 4, 5 or 6 tenement house, with 5 or 6 outlets to a tenement, they cut that price quite a little. I don't know what the lowest prices are; I think the work has been done at $1.75. This is done at a profit. The profit seems to be sufficiently satisfactory for the fitters to continue the work and to be glad to get it—not only to continue the work but to solicit it. So that, in addition to our solicitors, we have probably 8 or 10 gasfitters constantly soliciting work in piping buildings, and probably for the sale of fixtures also. Some of them sell fixtures; some do not.

The President—Is that price on concealed pipe?

Mr. Nute—It is all concealed pipe. They do a very good job. The pipe is all tested by the Company and required to come up to our schedule; that is, the ordinary schedule for the work. Every job is accepted by us before we set a meter.

The President—What is the usual depth of mains in Fall River?

Mr. Nute—Three feet of covering. In regard to the cost of main laying, knowing something of the territory at Winthrop, I should suppose that 37 cents a foot was a pretty high price. Of course I appreciate it is done by contractors at a 15 per cent. profit. It certainly can be done by the Company for very much less money than that. Although our average cost in Fall River last year was quite a little more than that, it was due to the fact that we ran on to a large amount of ledge. We generally have more than a fair share, but last year we struck any quantity of it.

The President—Mr. Coffin, will you give us an explanation of the

extra cost of pipe laying in ledge? Gloucester is nearly all ledge; isn't it?

Mr. Coffin—We have about one-third ledge in our city. After keeping run of it for about 21 years we estimate ledge at $1 per running foot for excavating. It will average about 3 feet covering; 3 feet 6, 3 feet 8, ledge. Of course, we strike once in a while something that we call nigger head, where you cannot drive more than 2 or 3 inches to drill point, and it won't blow anyhow; there does not seem to be any rift or lift to it. There it will cost more. But our average is practically that. Our pipe laying for 20 years is probably, pipe and all (an average of 6-inch pipe) about $1 a foot. That will include digging and all including one-third ledge. We used to pay as high as $4 a yard; and we figured a ditch 3 feet in length, and it would practically be a cubic yard of ledge, or $1.33 per foot in length. We have got it down now. We have a steam drill; use dynamite instead of black powder, and a battery. Where we used to blow years ago a single hole we cut 16-foot oak wood and put in holes closer together, blowing 4 holes together, using smaller drills. Where we used to drive 1⅛ steel, which would be 1⅜ point, we drive ⅞ steel, which would be about 1⅛ point. We find we can drive it almost as quick again by the use of hammers. When we use the steam drill we have 1¼-inch and larger cartridges. We are not enabled to do that in the city. Outside, where we can blow heavier, we use the steam drill, but in the city we use the ⅞ drill. If I were going to estimate a line of pipe to be laid to-morrow, I should call it about $1 a foot, pipe and all, and about one-third ledge. That covers the pipe.

Mr. Allyn—I would like to inquire what method Mr. Coffin adopts to prevent the particles of rock flying and causing damage.

Mr. Coffin—We take the wire binders that come round baled hay and use a large quantity of them. For instance, we will cover it over a foot. After it has blown several times, it will mat together so that you can take it all off as one piece. It acts as a spring, holds all the particles of rock, and saves the concussion on your wood, where you use the latter. Then, if the wood blew up, we use the slivers and soft pieces to pack into the bottom. We find the wood lasts as long again. This goes up as one piece when you blow, and it holds everything. Last year we only broke two lights of glass by the small pieces flying. We used to be able to throw a 4-foot stick of wood through a door, but we got over all those things.

Mr. Allyn—We happened to get the idea of using condemned, woven wire mattresses, which certainly are the most effective arrangement we have ever struck. They are glad to have you take them away from the factories when they condemn them. We put them on 3 or 4 deep. They prevent almost every particle of rock flying.

The President—Mr. Coffin, how do you fill in the trenches in Gloucester, where they are laid through ledge?

Mr. Coffin—Where there is dirt enough to bed the pipe and cover it about a foot we do that; then we take the finer part of the rock and get something for top dressing. The rest we can usually give away. Sometimes the city will carry it to the crusher; we will load it, and they team it off for the sake of material.

Mr. Africa—The average depth over our mains is 3½ to 4 feet. Most of our digging is sand, although we have some ledge. I have a memorandum of the cost of 6 extensions of a 4-inch and 6-inch. The shortest one was 116 feet, the longest 1,600 feet, making a total of 3,701 feet of 4 inch; average cost of labor 13.43 cents per foot; 6-inch, 4,032 feet, average cost 13.96 cents per foot for labor alone. I haven't the cost of the material.

The Secretary—Mr. President—I would like to inquire if any members have had any criticisms on the depth of their mains from the insurance people on account of breakages by frost and consequent damage claims, from the fact that their mains were not laid below the frost line.

The President—How many members would lay their mains deeper than they now are laid, for any cause? [One hand was raised.]

The President—Those who are satisfied that their mains are deep enough will kindly raise their hands. [Several hands were raised.]

Mr. Allyn—I would say, Mr. President, that in our city it is not a case of satisfaction, it is a case of finding an opportunity to lay pipe. The original plan was to have the gas mains laid about 3 feet, and the water main from 4 to 4½ feet, and then the shallow house sewers would come anywhere from 1½ feet to 2 or 3 feet under that and then the deep sewers; but of late years, since the telephone companies have commenced the laying of the electric conduits, the whole equilibrium has been disturbed. They will run along on a given level until they strike some obstruction, when they will dive down, in some cases, 7, 8 or 9 feet deep, and when they clear the obstruction which they have met they will come up again to the original level. So that it is a difficult matter in some cases to find a way through the streets for our pipes. In Somerville and Cambridge they have in recent years started on the construction of storm sewers, in addition to the regular sewerage system. Then we have the metropolitan water system and the metropolitan sewerage system, so that the streets are becoming so congested with pipes of one kind or another that when we had occasion to lay a 24-inch feed main 3 years ago we came to one point where we found it impossible to get the main through without diving down I think to a depth of 7 feet—in order to cross from a depth of 2 feet to a depth of 9 feet, the street was literally filled with sewers, water pipes and conduits.

Mr. Cathels—Mr. President, regarding the depth of mains in streets, I may say that I came from a town which is considered to have pretty cold weather. Our average depth was 3 feet 6. The city this last 3 or 4 years has spent a great deal of money on putting down permanent roadways. The Gas Company before that was done took the precaution to examine all the mains in the streets where this work was contemplated, and we spent a great deal of money in that way. I must say that I felt disappointed in having spent so much money, because really we found our mains in excellent condition. We found very few leaky joints, and the mains altogether were in excellent condition. This was in a town where it is considered very cold, a town in Canada. I am satisfied from that that 3 feet 6 is plenty deep enough, as far as the effect frost would have on the mains is concerned. We found trouble in our services a great deal more than we did in the mains.

The President—I have here a statement of the cost of laying water mains in Providence at an average depth of 5 feet, in 1901, for sizes from 4 to 36, with iron at $30, and in 1900 with iron at $35. In comparing the results for large sized mains, 12 and 20-inch, I find that the prices here agree within 1 per cent. of what I found was the cost for laying gas mains at a much less depth. Apparently the city employees did pretty good work in this instance. The Providence statement is:

Providence, R. I.—City Engineer Otis F. Clapp, Annual Report, 1901.

The approximate cost of laying ordinary water pipes, with appurtenances, except hydrants, and including iron at $30 per long ton:

For	4-inch	$0.498	per foot.
"	6 "	0.725	"
"	8 "	0.973	"
"	10 "	1.244	"
"	12 "	1.593	"
"	16 "	2.403	"
"	20 "	3.359	"
"	24 "	4.454	"
"	30 "	6.348	"
"	36 "	8.540	"

Providence, R. I.—City Engineer Otis F. Clapp, Annual Report, 1900.

The approximate cost of laying ordinary water pipes with appurtenances, except hydrants, and including iron at $35 per long ton:

For	4-inch	$0.556	per foot.
"	6 "	0.815	"
"	8 "	1.098	"
"	10 "	1.408	"
"	12 "	1.8009	"
"	16 "	2.730	"
"	20 "	3.817	"
"	24 "	5.052	"
"	30 "	7.195	"
"	36 "	9.683	"

Mr. Richardson—I don't think that I have at hand, Mr. President, any figures; but the average, if I remember, in our soil is from 12½, 13, 13½, varying from 3 to 4 feet and 6 inches. We have abandoned the use of 3-inch at the present time. A 6-inch pipe would not average much more than 13½ cents to lay in portions of our soil. Fortunately, there is very little ledge in the center of North Adams. We endeavor to lay the mains, however, deeper than 3 feet 6 inches, as many times, in such work as we can do in the winter; we find frost at a depth of 5 feet. In the New England climate, in my opinion, if we could lay a main 6 feet deep we would be saved a great deal of trouble. Some winters—it seems to go in cycles—we don't have much trouble, and in others there are a great many broken pipes. This season, the snow coming earlier and before the cold weather, the frost has not gone so deep. We have had but 2 broken pipes. I have not any especial data in my possession, Mr. President, but it averages about as has been said.

Mr. F. W. Humphreys—I would like to ask Mr. Tenney if he can give us the average length of pipe from meter to stove. He has given the cost of setting the meter and this pipe as $5.04.

Mr. Tenney—I should say off-hand that it would take about 32 feet of pipe, roughly speaking. Some of them were less than that, and, of course, some of them took more.

Mr. F. W. Humphreys—Did that include the cost of the meter connections as well?

Mr. Tenney—Yes; that included the meter connections.

[On motion of Mr. Leach, a vote of thanks was tendered to Mr. Tenney for his very interesting paper.]

[To be Concluded.]

Gas for Industrial Purposes.

[A paper read by Mr. James H. Walker, of Milwaukee, Wis., at the Second Annual Meeting of the Wisconsin Gas Association.]

Not so many years ago to mention gas for any other purpose except illuminating would have branded the orator as a man of very advanced ideas, and if he predicted the results of the present day in the use of gas for fuel he would have been considered a fit subject for investigation as to his mental capacity.

We all know the results of the introduction of fuel gas for domestic purposes and the beneficial returns to the gas companies that have intelligently pushed this line, but I question very strongly whether we fully understand the full meaning of the term "Industrial" as applied to gas consumption. It is certainly true that there are very few gas companies in the country to-day that are reaping any very benefical returns from this branch of the business, for the reason that the field is still untried by the average gas superintendent, not on account of his lack of enterprise, for he has shown that in other branches, but perhaps from lack of knowledge as to how best to go at the introduction of this branch of the business. I think the experience of the Milwaukee Gas Light Company in the introduction of gas for industrial purposes has been broader and more varied than that of any other company in the country, and its success has been largely due to its liberal concessions to consumers in the shape of free connections, and in many cases almost free apparatus; especially is the latter the case in the first installation of new and untried apparatus. The writer has been in charge of this department for the past 4 years and has personally conducted all experimental work connected therewith, and when a start was made, industrial gas, or gas for fuel purposes, other than domestic, was almost wholly confined to the heating of soldering irons, tailors' and laundry irons and an occasional blowpipe for brazing, in book binderies for embossing, a stray glue pot or two in the furniture factory—perhaps a single burner hot plate was sometimes used for melting a few pounds of soft metal; but, taking all of these purposes mentioned, there was no single apparatus that would consume over 25 feet per hour at the maximum, while to-day the various purposes for which gas is used in industrial lines number over 50, and the consumption ranges from the chemist's Bunsen to the melting furnace, consuming from 360 to 420 cubic feet per hour.

The following is a partial list of the purposes for which gas is used in an industrial way, with the cost per unit for performing the work with illuminating gas of about 650 B.T.U. per cubic foot at the price of 80 cents per 1,000 cubic feet:

Table of Cost of Performing Various Kinds of Work Using Gas for Fuel.—Calculated upon Basis of 80 cents per 1,000 Cubic Feet.

Work.	Quantity.	Cost.
Ham or meat boiling	per 100 pounds	$0.04½
Frying doughnuts, etc	per 100 dozen	.06
Boiling candy	per 100 pounds	.13
Boiling candy, soft boiled	per 100 pounds	.05½
Coffee roasting	per 100 pounds	.06
Rendering lard	per 100 pounds	.16
Forging soldering irons	per 100	.07 2/10
Heating soldering irons, 2 pound	per hour	.00½
" " " 3 "	per hour	.00 9/10
" " " 4 "	per hour	.01½
Band shrinking	per 100	.25
Rivet heating	per 100	.03
Keg branding	per 100	.05
Bung branding	per 1,000	.02
Tire setting, vehicles	per tire	.03
Tire setting, locomotive	per tire	.24
Brazing bicycle frames	per frame	.05
Brazing handle bars	per joint	.00 1/10
Heating laundry irons	per hour	.01
Babbit melting	per 100 pounds	.05 8/10
Brass melting	per 100 pounds	.32
Assaying gold ore	per assay ton	.01
Enameling bicycles	per frame	.01½
Drying beer vats, 225 barrels capacity	per vat	.38
Drying tobacco	per 1,000 pounds	.66
Distilling water	per gallon	.00¾
Heating water 100° above normal	per 1,000 gallons	1.61
Heating dwellings, 30,000 cubic feet space for every 10° raised above outdoor temperature	per hour	.01 6/10

It is not my intention, nor is it possible to enter into the details of all the operations enumerated, so I will only take up a few chosen at random from the list. The following cut illustrates a crucible furnace which has been used for melting brass for the past 3 years in one of our local shops, but it has only been within the last 60 days that I have been able to get what I call a commercial run, that is, when the furnace could be run to its full duty during the entire working hours of the day. I may say that in the case of former installations the furnace was never run to its full capacity, from 2 to 3 heats of varying weights and quality being all that was required of it, consequently the cost per 100 pounds for melting was a variable quantity from day to day, ranging from 40 to 50 cents. This latter furnace was installed about the middle of January, 1903. On January 16th the test was begun and and ended on January 24th, giving results for 7 full working days as follows:

Time of test, 7 days of 9 hours each; number of heats, 46; total weight of metal, 4,119 pounds; total gas consumed, 17,395 cubic feet; gas consumed per 100 pounds, 422.3 cubic feet. This at 60 cents per 1,000, the minimum rate for fuel gas in Milwaukee, would show a cost of 25.3 cents per 100 pounds.

In view of the fact that the most reliable figures that I have been able to get as to the cost for solid fuels show that it requires 1,000 pounds of coke to melt 1,000 pounds of brass, or 800 pounds of anthracite coal to perform the same work, which at the average price of coal, say $7 per ton, would be 28 cents per 100 pounds. This, of course, would vary to some extent, depending on the quality of the metal melted. That metal having the largest percentage of copper would, of course, require more fuel per 100 pounds than would metal having a low percentage of copper and high percentage of the lower fusion metals. This fact would be true also of gas, but the fact is that between heats the gas expense ceases, but with solid fuels the expense is continuous. This to some extent explains the low cost of gas for this work in comparison with coal. The other advantages of a gas crucible furnace are plainly evident. There is no expense for the handling of fuel. Experience has shown that crucibles will last longer, as there is no loss by abrasion. The furnaces are portable and require neither stack nor pit. In case of a crucible breaking in a gas furnace the metal is saved

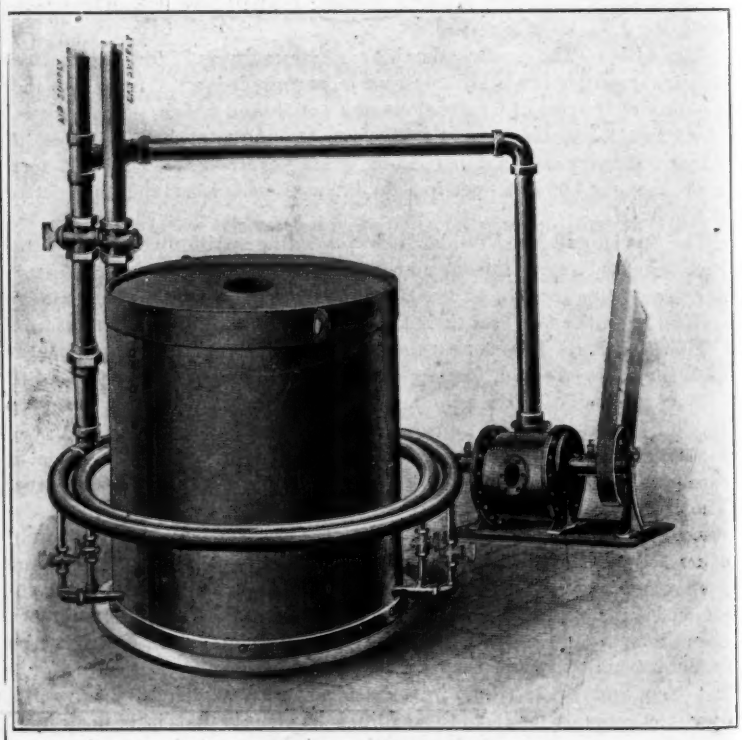


Fig. 1.—Crucible Furnace.

intact, whereas under the same conditions in a coal or coke furnace the ashes must be sifted and washed and the metal recovered by manual labor at a considerable cost.

Fig. No. 2 represents a non-oxidizing metal melter for use in machine shops for melting tin, babbitt, lead or any of the low fusion metals in quantities of less than 100 pounds. It is convenient in form and can be fitted with a pot to hold the metal, or the pot can be removed and the metal melted in the ladle. These furnaces consume from 70 to 75 cubic feet per hour, and will melt babbitt at a cost of about 5 cents per 100 pounds.

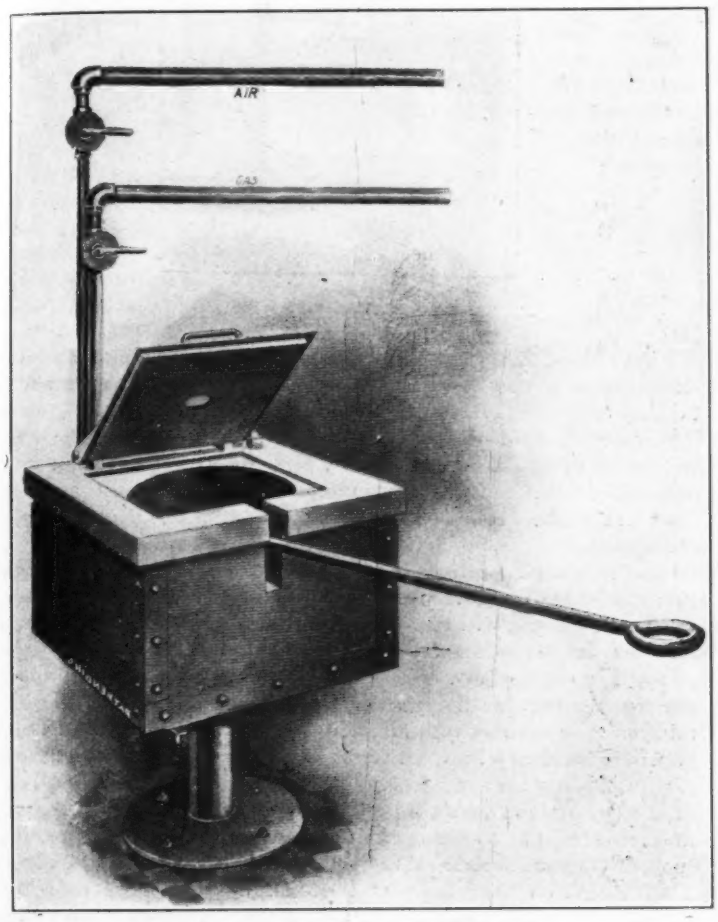


Fig. 2.—Non-Oxidizing Metal Melter. Ladle Furnace.

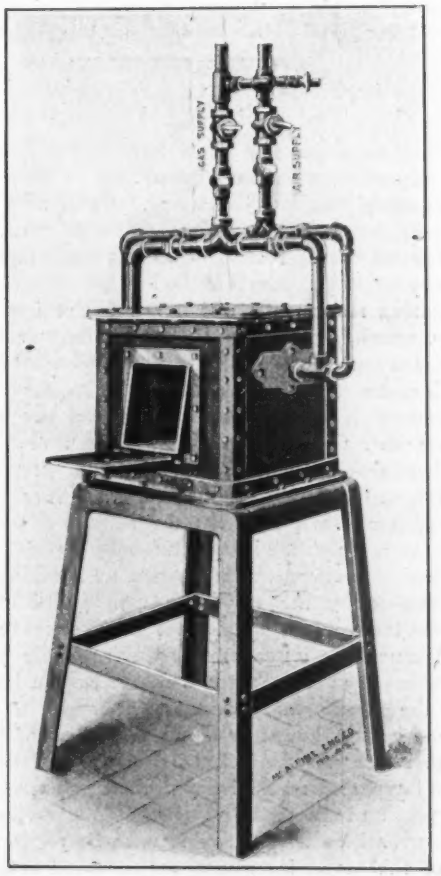


Fig. 3.—Forge No. 2.

Fig. 3 represents a type of forge used for case hardening and tempering dies and tools for machine shops, of which there are a number in use in Milwaukee. These furnaces are fitted with burners in position to give a rotary direction to the flame all around the article to be heated, at the same time no portion of the metal comes directly in the line of the flame, thereby avoiding any chance of uneven heating or scaling. The advantage of having the metal in full view of the workman is obvious, allowing him to see the color of the heat at any moment, a condition impossible with a fire of solid fuel.

These furnaces consume about 140 cubic feet per hour, and constitute a very reliable consumer, by giving positive satisfaction to the operator. A most satisfactory field for the use of industrial gas is in the factories where small specialties are made, such as saddlery hardware, etc., in the use of the tinning furnace. While we have a few small furnaces of this class in Milwaukee, the largest ones that I have built are in use in Racine, the kettles (Fig. 4), holding about 700 pounds of tin. These

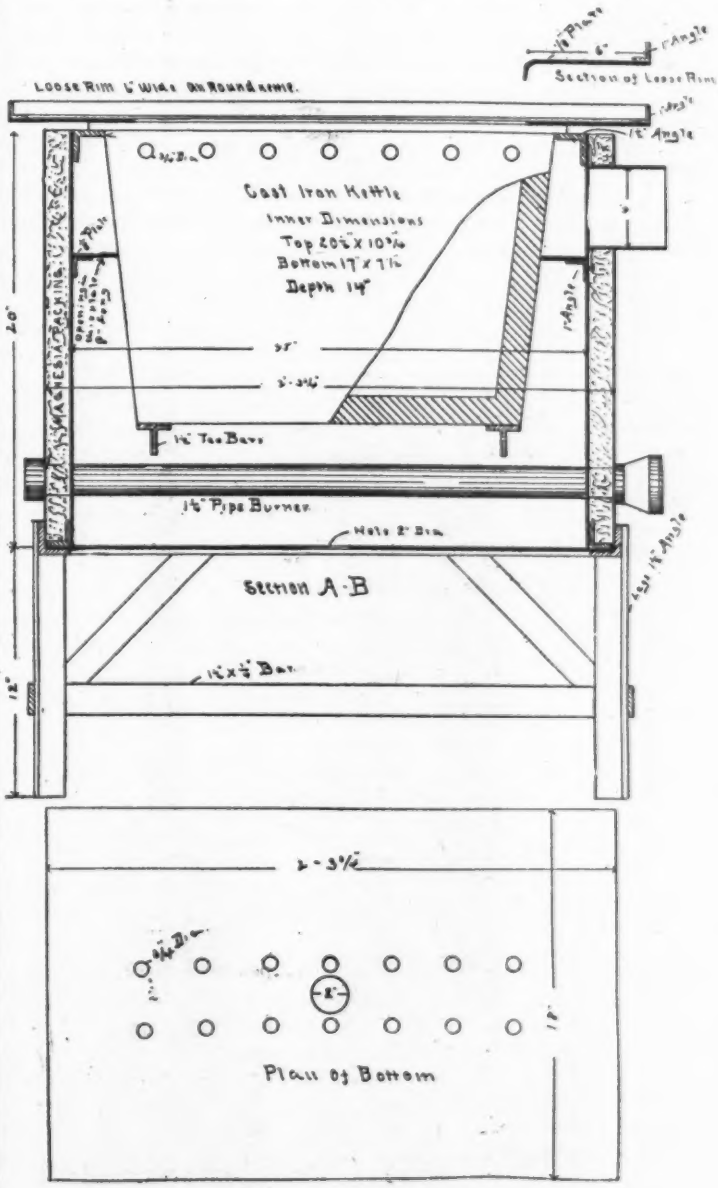


Fig. 4.

furnaces are operated without the use of an air blast, are very economical in operation, and are a steady source of income to the gas company. One feature of this furnace which recommends itself to the observer is the arrangement of the openings on either side of the kettle and close to the upper flange, allowing the products of combustion to pass directly into the pot and over the surface of the metal, thereby excluding the oxygen from the surface of the metal, its place being taken by the carbonic acid and hydrogen, consequently the oxidation of the metal is reduced to a minimum, a large saving over other methods of melting,

especially so in the case of tin which is quite expensive. To show that this principle is correct, in practice as well as theory, the patent office issued a *process* patent covering the same.

One of the simplest and most productive of industrial gas appliances that I have introduced to our manufacturers is that which I call a multiple burner. These burners (Fig. 5) are constructed in either

Fig. 5.

single, double or triple sections, with a capacity ranging from 25 feet to 150 cubic feet per hour, each section having a stop cock. The changes and combinations are very numerous. The efficiency of this burner is very high, owing to the fact that the secondary air passages are arranged so that the air is brought closely in contact with the flame at the point of ignition, and each and every jet receives its full quota of oxygen. The uses to which this burner can be put are innumerable, as its general construction is such that it can be adapted to almost any form of apparatus, whether especially constructed for the use of gas or otherwise. It is used in its various combinations for confectioners' furnaces, bakers' ovens, metal melters, ham boilers, butchers' kettles, core ovens, tanks of all kinds for boiling water, oil, etc. It is used in the laundry stoves and water heaters as illustrated in this paper; in fact, its field is unlimited and the income derived from these useful appliances is equal to that from 6 to 12 domestic ranges.

The water heater (Fig. 6) illustrated in this paper is very successfully

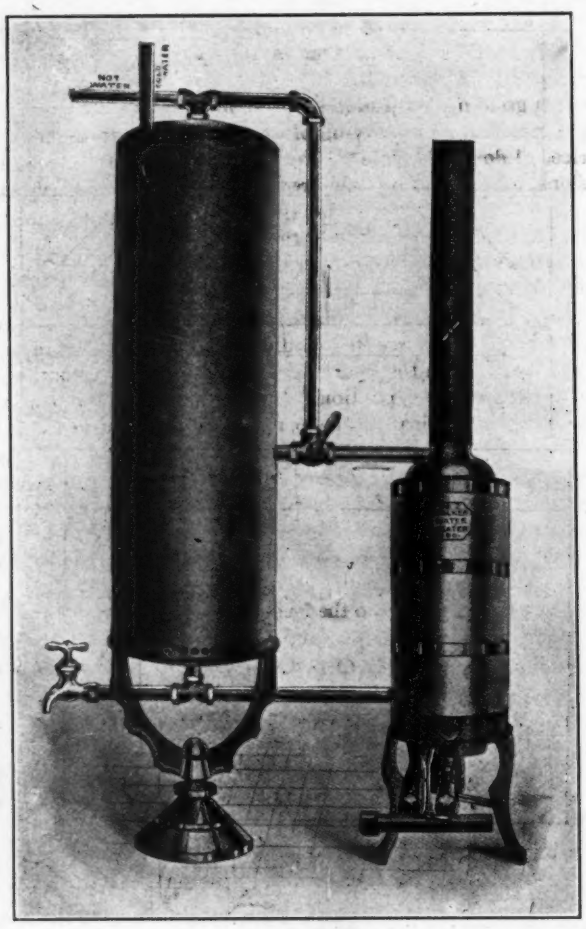


Fig. 6 —Walker Water Heater.

used for heating reservoirs of a capacity from 60 to 200 gallons, mostly in use in manufactories and large institutions. I have also used it as an auxiliary heater in hot water systems for heating dwellings, especially in the spring and fall, allowing the householder to use gas with fair economy for about 5 or 6 weeks at either end of the season.

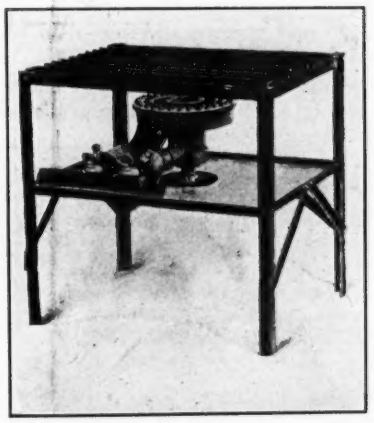


Fig. 7.

We have about 16 of these heaters in use for this purpose, and with the exception of a very few installations, they have been successful in their operation and satisfactory to the consumer.

The subject of this paper is a very fruitful one, one which could be written about almost indefinitely, if a person were to go into all the details of the experimental work connected herewith. To the gas superintendent it should recommend itself as a new and ever-increasing source of revenue, with the advantage over the domestic trade that any one form of industrial gas appliance is equal to from a half dozen ranges to 100; with only one service and one meter to take care of, the investment and repair account will be very much smaller in proportion to an equal income from domestic sources. To get this business in your own city you will be required to spend plenty of time and money in finding out the requirements of the prospective consumer and make a liberal arrangement or contract with him that will allow him plenty of time to give the apparatus a fair trial before paying for it. The Milwaukee Gas Light Company has spent a great deal of money in experimental work in this department, and gas superintendents may reap the benefit of their researches through the medium of their published matter on the subject, but your success cannot depend wholly upon these results, but must depend on your individual efforts. I trust I have made a few statements that will call for criticism, as there is nothing like criticism for starting a discussion, and the subject at least is worthy of it if the paper is not.

I thank you for your kind attention, gentlemen, and trust that the information have given in this paper will interest you.

The Nernst Lamp.

Engineering says that the latest form of the Nernst lamp is now familiar to almost everyone in England. It is made in two patterns, known respectively as "A" and "B." The burners for the "A" lamp are manufactured for 1 ampere up to 150 volts, and for ½ and 1 ampere up to 250 volts. The "B" lamp is manufactured for ¼ and ½ ampere up to 150 volts. Much of the interest centers in what is called the "bolstering resistance," which is made of iron wire sealed in a glass globe, which has been evacuated and afterwards filled with hydrogen. The iron wire is used on account of its high temperature correction, which makes it particularly suitable. As, for instance, should the current increase 5 per cent., the resistance of the iron wire increases about 75 per cent., thus preventing the destruction of the filament. The increase of the resistance of the iron wire is not proportionate throughout its range, and it is therefore necessary that the sectional area should be chosen with a view to heating the wire to a critical temperature at the current with which the lamp is intended to burn, in order to arrive at the balancing of current by resistance. Something like 30 or 40 volts can be absorbed by this resistance with practically no increase of current; and the result of that is that when series resistances are used with the filaments, a much more regular candle power with variation of voltage is obtained than with the carbon lamp. The candle power of the Nernst lamp does not increase in anything like the ratio of the carbon lamp for equal variations of voltage. This resistance, therefore, may be looked upon as one of the turning points in the Nernst lamp, and its efficiency in this respect is so great that it will certainly play an important part when used in series with the ordinary carbon lamp, where the voltage is not very regular. The wonderful capacity of this device for giving an increased resistance with a very slight increase of the electromotive force will render it advantageous in

connection with arc lamps, and also for incandesent lamps running in circuits in which the pressure varies very considerably, such as tramway circuits and the like. The Nernst patents are owned by the Allgemeine Elektricitäts Gesellschaft in Germany, by the Nernst Electric Light Company in England, by the Westinghouse Company in America, and by Messrs. Ganz in Austro-Hungary. There was an attempt to unite the four companies in a consultative committee, which should enable the results obtained by any one in the course of their experiments to be put at the service of the other three. However, the attempt was not successful, and each company went on with its own experiments. The English company made considerable progress; but owing to other difficulties than technical ones, they eventually arranged for the Allgemeine Elektricitäts Gesellschaft to manufacture for them. Very little is known as to what had been done by the Westinghouse Company, while Messrs. Ganz & Co. are understood to have relinquished the matter for the present. In Hackney a mile of road was lighted by these lamps, and an accurate record kept of their performance. The life of the lamps was very irregular. Some failed after only a few hours, while others burnt for several hundred hours. The average life of those that failed was 305 hours. These facts were related in a paper on "The Nernst Lamp," read by Mr. J. Stöttner before the Institution of Electrical Engineers on Feb. 26, and in the discussion which followed Mr. Stöttner said that the short life of the lamps at Hackney was mainly due to small mechanical defects, which were rapidly being overcome.

SPECIAL ENGLISH CORRESPONDENCE.

COMMUNICATED BY NORTON H. HUMPHRYS.

SALISBURY, ENGLAND, March 10th, 1903.

Municipal Trading.—A Bad Heating Gas.—New Gas Works at Edinburgh.

Some interesting side lights on the capabilities of municipal bodies, as the practical managers of important trading concerns, has been afforded by certain proceedings at two places. At Dublin, the Municipal Council appointed a committee more than a year ago, to examine the working of the various departments under the control of the Council, with power to examine all books and documents, for the purpose of ascertaining whether greater efficiency and economy may be obtained. After about 30 sittings, during which the work of the Paving Improvement Committee, the Market and the Water Works Committees, the Cleansing, Lighting, Public Health and Estate and Finance Committees, have been investigated, the committee have submitted a first report. The condition of affairs thus disclosed is one that would not obtain in a private company. In the secretarial department of the Paving and Improvement Committee, for example, a staff of six clerks were engaged in writing up the minutes of the fortnightly meetings and in replying to an average of about seven letters per diem. The chief executive officer of the Committee said that, although the Committee exercises no control as to the employment of workmen, he had not a free hand, insomuch as pressure was constantly brought to bear upon him by members of the Council and others to give employment to persons whom they recommended. He admitted having a great many more men employed than there was any need for, and the Committee were satisfied that positions had been created to give employment to certain individuals. In the sewers department, out of a permanent staff of 90, a large proportion were found to be wholly incapable of discharging any work, though maintained at the full rate of wages, and generally it appeared that the practice was freely followed in all departments of retaining men at regular pay who, from one cause and another, were unable to do regular work. One man who figured on the time sheets as working six days a week was stated to go about on crutches, and others were not even able to present themselves on pay night. The Committee were a very strong one, with the Lord Mayor as Chairman, and they made several recommendations with a view of remedying this state of things. One effect of the appointment of the Committee has been the removal of several of these paper men from the lists, and the Lord Mayor remarked that this course was unfair to him, as there was a report throughout the city that he was taking away their employment. This remark illustrates the anomalous position of a councillor who is called upon in the course of his duties to settle various matters relative to the employment or non-employment of persons who pay rates. He must of necessity consider his own position and is loath to do anything that will lose the support of a number of votes. It is the system rather than the individuals that is at fault. Probably in the appointment of committees it is possible to utilize to some extent the special abilities or experience of each councillor, but it must frequently happen that the working of an important department, perhaps the gas, perhaps the water, gets under the control of a committee who have no special qualifications, to say the least, for such a position. The same thing may happen, though in a minor degree, with the directorate of private companies, and a director may be selected for the simple reason that he is a large shareholder, without regard to personal fitness; but then there are always on the board one or two persons who are either experts in the business, or have by experience acquired an intimate knowledge of the working of the concern. The directors, moreover, know that their office is practically secure to them, so long as they capably discharge the duties. The chairman of a municipal committee has no similar inducement. To begin with, he gets no pay; and it is not everyone that can afford to bestow the necessary time and energy to qualify, say for the chairmanship of a gas committee on a gratuitous office. And if he is willing to do this, there is no certainty as to the future. He may have a good working committee this year, but next year may have a majority who are opposed to him on political or other grounds. So the special work he is doing may not come to the knowledge of a majority of the voters, and the particular qualifications he has developed do not necessarily include the art of securing or retaining suffrages. So that he is liable at any election to be displaced by popular clamor, or by someone who is a more expert vote catcher. Competent chairmen of committees are to be found notwithstanding all these drawbacks, but the circumstances and surroundings are not favorable to securing them in the first place, or to retaining their best services when secured.

The other place in view is Nottingham, and the proceedings in this case refer to the Corporation Gas Works alone. On the occasion of the presentment of the last annual report the management of the Gas Committee received some hostile criticism, and comparisons were drawn between their results and those of a neighboring gas company. Under these circumstances the Gas Committee followed a wise course in obtaining the best available, independent, expert advice, by engaging Sir George Livesey, Chairman of the South Metropolitan Gas Company, to investigate and report on the whole matter. For this they deserve the thanks of the gas profession at large, as the report presented by Sir George Livesey deals fully and with characteristic pertinence with the conditions which go to make up successful gas management, which in a word may be summed up as the giving of efficient service at the lowest possible price. I do not propose to attempt a summary of the report or its conclusions, as you will probably reproduce it for the benefit of your readers, as being well worthy the attention of everyone concerned in gas works' administration. The author has not the fear of offending the voter before his eyes, though for that matter he would be the last to sacrifice his independence in the slightest degree, and is able to take up a position as an impartial outsider, and to express his views with a degree of freedom and force that would not be practicable in a report emanating from within the four walls of the Council Chamber. His remarks on the relative positions of the chairman, the commercial manager and the technical engineer in regard to the success or otherwise of the concern, apply with equal force to any undertaking, whether public or private property. And they go to emphasize the moral drawn from Dublin, that the managing committee, if it is to be anything more than a mere official skeleton, must include special skilled qualifications. Municipal conditions do not favor either the securing or the retaining of such special skill.

I have frequently alluded to the fact that the photometer is gradually being replaced by the calorimeter, and a complaint that has been published in the Birmingham papers, relative to the quality of the gas as supplied by that corporation, is an instructive indication of the new era. We are all fairly well acquainted with the gentleman who is willing to pay for "gas" but does not require "air," or who takes a candle to find out where the gas lights are; but although it has frequently been remarked that gas is used as much for its heating as for its lighting qualities, I have not previously met with a complaint as to heating value before. A manufacturer brings a charge that, if capable of substantiation, is a serious one. He says there has lately been an important diminution in the heating values of the gas. In the year 1900 the japanning stoves heated with gas cost for gas consumed 9¼d. per cwt. of work, whereas at present they cost 1s. 5d, and the cause is said to be the introduction of water gas.

The result is that while the gas apparatus was put in at great cost as likely to prove cheaper than coal, it is now very much more costly. It is scarcely likely that the gas of 1903 is deficient in thermal units to the extent of nearly 50 per cent. as compared with that supplied in 1900. Probably the burners of the apparatus in question were adjusted in the first place to use straight coal gas, and the introduction of mixed gas, of a different specific gravity, has somewhat upset the adjustment.

Such a complaint can scarcely be allowed to gain currency without some official reply being rendered, and it will be interesting to know what is to be said on the other stde. Meanwhile, judging from past experience in the lighting department, we may soon expect to hear from the gentleman who finds a so-called gas heating stove to be really an excellent refrigerating machine, or who gathers condensed hoar frost from the neighborhood of his gas burners. It is well to remember that people who use gas for technical purposes have a practical test of its quality that is not available in the case of that used for lighting, and that the "cost per cwt. of work" is likely to have an important effect on the demand for gas to be used for such like purposes.

The event of the month was the opening of the new gas works at Granton, belonging to the Edinburgh and Leith Gas Commissioners. The question of the increased demand for gas in the Scottish capital has been a matter calling for serious attention. Notwithstanding the introduction of the electric light in 1895, the demand for gas has increased at the rate of over 50 million cubic feet per annum, and the works owned by the Commissioners were situated in crowded parts of the city, rendering extension impracticable. Under these circumstances the Commissioners, with commendable enterprise and energy, decided to transfer their operations to a site well out of the town and to concentrate them all at one place, and secured a suitable site for such purposes at Granton, about 8 miles from the center of the district. The foundation stone for the new works was laid in October, 1899, and on Friday, the 27th ult., the opening ceremony for the first section of the new works was held. The whole was carried out under the designing and superintendence of the engineer to the Commissioners, and one characteristic feature of the plant is its essentially modern and up-to-date character. Inclined retorts, mechanical charging and conveyance of materials and other new ideas are to be met with, as is appropriate to a plant that is brand new from the foundations. The inaugural ceremony passed off in a manner that was fully satisfactory to Mr. Herring and all concerned. The cost of the land acquired, which includes about 106 acres, was £125,000, and up to date about £500,000 has been expended in buildings and apparatus. Operations were really commenced at the new works in October last so as to render them of some use during the busy season. The purifying plant includes two washer scrubbers arranged for the recovery of cyanogen compounds from the gas, and a noticeable feature is the pumping station for driving gas at a pressure of 5 pounds to gasholder stations situated in various parts of the extensive district. It includes two of the largest rotary exhausters in existence, each driven by means of a 125-horse power gas engine, and capable of dealing with 750,000 cubic feet of gas per hour. The trunk mains in connection with this apparatus are 4 feet in diameter. The works also include a product department, including plant for the manufacture of sulphate, chloride, nitrate, and concentrated liquid ammonia, for the manufacture of briquette fuel from coke dust and pitch, etc. There is a very complete set of workshops filled with machinery. A large portion of the work was executed by the Commissioners' own staff and other portions were let by contract in regard to labor only, the Commissioners supplying all materials. Works erected in this manner represent a marked difference as regards the amount of work and responsibility undertaken by the engineer and his staff as compared with the usual practice of letting the whole by contract. It is a simple thing to let out the contract for a holder to one firm and for the tank to another, but a very different state of affairs when the engineer himself undertakes the excavation and construction of the tank, and Mr. Herring must have had a very active time during the last 2 years. Space does not admit anything like an adequate description of this important new works, but the erection of a structure of such magnitude is a very important event, not only in the history of Edinburgh but also as regards the gas industry at large. What better reply can be furnished to those who say that gas is played out, and that a steady decrease in demand may be looked for, as other competing agents get into line? Mr. Herring and the Edinburgh Commissioners are not playing to the tune of a decreasing consumption. The new works will be the means of introducing economy in working expenses that will enable the price of gas to be reduced, and with cheaper gas will come a large increase in demand. Without energy and enterprise indeed, the prospect would be gloomy, but given a reasonable exercise of these qualifications, which indeed are essential to success in any line, the future of the industry is fully assured.

One of the best remedies for stationary or declining trade is a brand new works, but it is better to follow the example of Edinburgh and exercise foresight by providing improvements at the proper time and before the need for them becomes painfully apparent.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

MR. E. S. CATHELS, formerly Engineer and Superintendent of the Hamilton (Can.) Gas Light Company, and whose temporary appointment as Superintendent of Works to the Providence (R. I.) Gas Company was, as heretofore reported in the JOURNAL, has been permanently appointed to the last named position. He will have supervision of the plant betterments that are to be made on the Providence plant this season, which betterments it is estimated will involve an expenditure of $500,000.

AT the annual meeting of the Hamilton (Ont.) Gas Light Company the officers elected were: Directors, F. W. Fearman, John Proctor, Henry McLaren, Wm. Gibson, Wm. Hendric and Edward Martin; President, F. W. Gates; Vice-President, John Proctor; Superintendent, R. A. Wallace.

MESSRS. CHARLES R. SMITH and George B. Van Vranken were recently elected Directors of the Cadillac (Mich.) Gas Company, vice Messrs. A. D. Cressler and F. W. Freese. Mr. Van Vranken was elected Secretary of the Company and John Owens was appointed Superintendent.

THE Montgomery Heat, Light and Fuel Company, to manufacture and supply gas in the boroughs of North Wales, Lansdale, Hatfield, Sonderton, upper and lower Gwynnedd, Tilford, Montgomery and Franconia, Montgomery county, Pa., has been organized by Messrs. W. H. D. Godshall, H. E. Weachter, Frank Pownall, Wm. H. Zimmerman and others. They will apply to the Governor for a franchise on the 20th prox.

A CORRESPONDENT forwards the following, dated Hartford, Conn., March 21st: "Before the Committee on Incorporations of the Connecticut Legislature there appeared on Wednesday last ex-Senator A. J. Sloper and Judge James Roche, who explained the purpose of the petition of the New Britain Gas Light Company for power to increase its issue of bonds from $150,000 to $400,000. They said that the increase was needed for the development of the plant of the Company and for its extension to a greater extent into the residence sections of the city. President E. B. Bailey of the Windsor Locks Electric Light Company explained the petition of the Company for permission to sell gas in Windsor Locks and Warehouse Point. He said the Company was organized 10 years ago. An act of the Legislature passed several years ago gave to the Company the right to sell gas in addition to electricity in Windsor Locks and Warehouse Point, but the Company had not taken advantage of the right and the time for doing so had expired. The capital stock of the Company was $20,000 and its bonded indebtedness was $30,000. All of the stock, except 10 shares, was owned in Windsor Locks. The Company now asked for a renewal of rights previously granted to it. James Keevers of Windsor Locks opposed the granting of the petition and said that the Electric Light Company never intended to furnish gas. In his opinion the increase of power was asked for for the purpose of shutting out anybody else. Edward Maher, of Windsor Locks, said that the great majority of the people of his town were opposed to the granting of the petition. There was a feeling of distrust in regard to the Electric Light Company. He did not think the service was good nor the prices reasonable. He was of the opinion that a Gas Company would be formed and thought that the Electric Lighting Company wanted to head it off. E. P. Eagan, of Windsor Locks, also opposed the petition. Treasurer William Mather of the Electric Light Company said the Company had used meters in its service for 3 years but could not make the service pay in that way. The lights were then classified and all who wished lights could have them by paying at the rate of $2 per year for each light. Secretary Douglas of the Company said the privilege asked for had been granted to the Company 2 years ago, but through neglect had not been taken advantage of. Representative Erey, of East Windsor, opposed the granting of permission to the Company to furnish gas in Warehouse Point. The petition of the New London Gas and Electric Company to increase its capital to $500,000 was postponed, as was also the petition authorizing the Bridgeport Gas Company to increase its capital to $200,000."

MR. ALBERT F. KIERSTING has resigned the position of Superintendent to the Danville (Ky.) Gas Company to accept a responsible place under Mr. Ralph Woodward in the affairs of the Pittsfield (Mass.) Coal Gas Company.

"THE Western Gas Construction Company, of Fort Wayne, Ind., has been awarded the contract for three 11-foot sets, of its special ex-

tended carburetter and superheater design of water gas apparatus, with scrubbers, condensers, iron charging floor, etc., which will make quite a World's Fair exhibit—the aforesaid apparatus is to be erected in St. Louis, Mo.—in connection with the two lately completed 10-foot sets of apparatus of the same type, besides the reconstruction of 4 of the Laclede Company's sets of old apparatus to a like design.—* * * ."

MR. CARL H. GRAF has resigned the position of Engineer-in-Chief to the Gas and Electric Company, of Bergen county, N. J. This should leave an additional opportunity of advancement for Mr. E. A. Pearce, the Company's Treasurer and General Manager!

ON the 21st inst. Mr. William B. Given, President of the Lancaster (Pa.) Gas Light and Fuel Company, issued a notice that the price of gas for illuminating purposes on April 1st would be restored to the rate that ruled prior to January 1st last. At that time the price was $2 per 1,000 cubic feet, with 25 per cent. off for prompt payment—within 10 days. On account of the increased price of coal that discount was cut in two, January 1st, and the rebate of 20 per cent. on electricity was abolished. In a few days the rate on the latter will also be readjusted.

MR. I. C. ELSTON, formerly of Keokuk, Ia., has been appointed Superintendent of the Michigan City (Ind.) Gas Light Company.

THE proprietors of the Utica Gas Engine Works are planning to remove their manufacturing plant from Utica to Oriskany Falls.

MR. GEORGE H. SHUMWAY, formerly with the Utica (N. Y.) Gas and Electric Light Company, has been appointed Superintendent of the electric lighting concern at Waterville, N. Y.

AT the annual meeting of the shareholders in the Charleston (S. C.) Consolidated Railway, Gas and Electric Company the following officers were elected: Directors, Robt. C. Davidson, Francis B. Casey, S. H. Wilson, George W. Williams, J. S. Buist, Wm. M. Bird, E. H. Pringle, George B. Edwards, Geo. A. Wagener and P. H. Gadsden; President, P. H. Gadsden; Managing Director, S. H. Wilson.

ON the 18th inst. articles of incorporation were filed, at South McAlester, I. T., by Messrs. R. M. Kramer, L. C. Kramer, Jas. Elliott, C. H. House and F. G. Dale, under which the Choctaw Gas Company was granted permission to manufacture and distribute gas in South McAlester and "adjoining boroughs." The Company is capitalized in $75,000, and the organizers propose to go on at once with construction work.

MR. SHELDON J. GLASS has resigned the position of Secretary-Treasurer of the Milwaukee (Wis.) Gas Light Company to accept a similar position with the American Light and Traction Company. He really succeeds Mr. W. F. Douthirt. Mr. Glass will have his headquarters in New York, and we all wish him the best of good luck. He is a clever and competent business man.

MR. A. L. WOOLLEN has resigned the Superintendency of the Fishkill (N. Y.) Company.

THE completion of the executive management of the Columbus (O.) Gas Light and Heating Company is as appended: President, John G. Deshler; Vice-President, George W. Sinks; General Superintendent, J. O. Johnston. The stockholders granted the Directors full power to deal with the question of operating or discontinuing the operation of the artificial gas plant at Columbus, but there is very little likelihood that the manufacture of gas in Columbus will be stopped.

THE "striking bill" to regulate the price of gas in Wilmington, Del., has been reported unfavorably.

THE proprietors of the Freeport (Ills.) Gas Light and Coke Company have announced that after the 1st prox. the gross selling rate shall be $1.25 per 1,000 cubic feet—prompt payment to entitle the user to a rebate of 10 cents per 1,000. The new scale is equivalent to a concession of 10 cents per 1,000.

AT the annual meeting of the Middletown (Conn.) Gas Light Company the following officers were chosen: Directors, W. H. Barrows, H. Woodward, S. T. Camp and W. T. Elliott; President, W. H. Barrows; Secretary and Treasurer, H. L. Mansfield; Superintendent, S. D. Clark.

WE understand that certain electric interests in Boston, Mass., have arranged for the purchase of the Citizens Gas and Electric Company, of Council Bluffs, Ia.

THE meeting of Managers of the syndicated Companies, that are now familiarly known as the McMillin contingent, was this year held in Detroit. There was a good attendance, and the proceedings were of an interesting nature. Several papers were read. Among them was one by Mr. R. B. Brown, of Milwaukee, whose paper last fall, in response to the proposition, "Why Milwaukee Did Not Build Inclines," brought him right in the glare of publicity. This time Mr. Brown put out a few modest remarks on "The Standard of Bench Construction and Operation." Later on Mr. Brown will find that all standards are not colored and reared alike. However, that's neither here nor there. A very sensible paper, on "Methods of Mapping Mains," was read by Mr. S. J. Glass. The officers chosen were: President, Mr. Paul Doty, of Detroit, Mich.; Vice-President, Irvin Butterworth, Denver, Col.; Secretary, C. N. Jelliffe, N. Y. The meeting next year will be held in Milwaukee, Wis., unless "Otherwise ordered."

A CORRESPONDENT forwards the following: "President John Thompson and Treasurer J. W. Anderson, of the East Boston (Mass.) Gas Company have advised the shareholders as follows: 'A majority of the stock of the East Boston Gas Company having been offered to Mr. C. L. Edgar, of Brookline, which he agrees to purchase, and for which he will pay the sum of $50 per share, we, the undersigned, hereby notify that the same offer to purchase at the above price per share is open to all of the remaining stockholders for their stock on and after March 16 next, and stock presented on and after that date, until April 15, 1903, at the National Suffolk Bank, 53 State street, Boston, will be accepted and paid for, on the same terms, by Mr. Edgar, or his representative, on proper assignment of such certificates of stock.'"

WORD from Duluth, Minn., is to the effect that, for the calendar year, to the 20th inst., the consumption of gas has increased as follows in percentage amounts: January, 42; February, 48; March—to the 20th—50. These percentages are reached on computations with the corresponding months of 1902. It has been decided, in view of the great increases noted, to shortly order a reduction in the selling rate of 10 cents per 1,000 cubic feet. That concession will put the price at 90 cents per 1,000 cubic feet.

A CORRESPONDENT in Cincinnati forwards the following: "It is pretty well understood here that Mr. Udolpho Snead is to be made President of the Louisville Lighting Company, the concern which is now in nominal control of the electric lighting of Louisville. The other officers will be: Vice-President, Mr. Harry Bishop; Secretary and General Manager, Mr. A. M. Worthington. Mr. Snead will, of course, continue in his position of President of the Louisville Gas Company. Mr. A. H. Barret declined a post in the Electric Company's service, preferring to devote all of his time to the work of the Gas Company, which is certainly booming at an amazing rate."

THE following is from a recent issue of the *Commercial-Tribune*, Cincinnati, O.: "The Directors of the Cincinnati Gas and Electric Company have under consideration an extensive improvement at the West End gas plant. This plant is an old one, and, of the two plants owned and operated by the Company, is the most exposed to high water interference. As it is at present, 56 feet of water starts the preliminary inconvenience there, which means serious trouble if the water goes to 60 feet and over. The matter under consideration is the raising of this entire plant 12 feet, thus placing it above the extreme record of the '84 flood, when the water reached 71 feet ¾ inch. This improvement will probably cost $500,000. The Directors also have under consideration a proposition to increase the capital stock of the Company $1,000,000, making the total issue $29,500,000. The increase will be acted upon by the Board at the next meeting."

IT is suggested that Mr. L. L. Kellogg, Superintendent of the Sioux City (Iowa) Gas and Electric Company, will be the successor to Col. Pratt, at Des Moines, Iowa.

A SAN FRANCISCO man recently stated that large numbers of Eastern manufacturers are beginning to establish plants in California for the purpose of saving freight rates on their products and to take advantage of the excellent facilities offered. The State has an abundance of cheap fuel in its oil fields and the great electric lines traversing the State are delivering electric power at small cost. There is a dense population in and around San Francisco which affords a market for the output of the factories, in addition to which the climate is practically the same every day in the year.

THE AMERICAN GAS LIGHT JOURNAL

A. M. CALLENDER & CO.,
PROPRIETORS.

THOS. J. CUNNINGHAM,
ELBERT P. CALLENDER,
EDITORS.

CHAS. E. SANDERSON,
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Notification Respecting Advertising.—Orders for new advertising, or for changes in standing advertisements, to insure attention in the issue following their reception, must be in hand any time of Wednesday.

AGENTS:

New York—American News Co. 39 and 41 Chambers St.
Germany—Lemcke & Buechner, of New York.
England—Aug. Siegle, 30 Lime Street, London.

MONDAY, MARCH 30, 1903.

The Market for Gas Securities.

Weakness was the prevailing feature in the local gas share market, and Consolidated closes with a loss of virtually 5 points for the week—the official figures to-day (Friday) being 205 to 206½. The scheme for a municipal lighting plant slumbers in committee at Albany, and some are bold enough to say that that is about as far as it will get this spring.

Brooklyn Union is 207 to 213, but the trading in the stock is of the shadowiest character. The gossipers again have it that steps towards closer relations with the Consolidated Company are being taken. Such a thing, of course, is possible, but to us just now that talk is talk pure and simple. Peoples, of Chicago, is weak in common with the general market. Well informed parties say that something of importance will shortly be brought off in connection with the Detroit City Company. Baltimore Consolidated is steady at 70. Cincinnati gas is weaker, on the proposed issue of $1,000,000 new stock.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

16 WALL STREET, NEW YORK CITY.

MARCH 30.

☞All communications will receive particular attention.

☞The following quotations are based on the par value of $100 per share.

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked.*
Consolidated	$73,177,000	100	205	206½
Central Union, Bonds, 5's.	3,000,000	1,000	109	111
Equitable Bonds, 6's	1,000,000	1,000	105	..
" 1st Con. 5's	2,300,000	1,000	118	120
Metropolitan Bonds	658,000	..	108	112
Mutual	3,500,000	100	310	325
Municipal Bonds	750,000	..	..	..
New Amsterdam Gas Co..				
Bonds, 5's	11,000,000	1,000	112½	113
Northern Union, Bonds, 5's.	1,250,000	1,000	106	107
New York and East River				
Bonds 1st 5's	3,500,000	1,000	112	113
" 1st Con. 5's	1,500,000	..	109	111
Standard	5,000,000	100	131	..
Preferred	5,000,000	100	152	..
Bonds, 1st Mortgage, 5's	1,500,000	1,000	115½	118
Yonkers	299,650	500	130	..
Out-of-Town Companies.				
Brooklyn Union	15,000,000	100	207	213
" " Bonds (5's)	15 000,000	1,000	119	119½
Bay State	50,000,000	50	⅝	⅛
" Income Bonds	2,000,000	1,000	..	75
Binghamton Gas Works	450,000	100	28	30
" 1st Mtg. 5's	509,000	1,000	93	96
Boston United Gas Co.—				
1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	8½	10
" " Bonds, 5's	5,250,000	1,000	79	80
Capital, Sacramento	500,000	50	..	35
Bonds (6's)	150,000	1,000	..	..
Central San Francisco	900,000	..	106	108
Chicago Gas Co. Guaranteed Gold Bonds	7,650,000	1,000	104	104¼
Cincinnati Gas & Elec. Co..	29,500,000	100	97	97¾
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	101	101½
Columbus (O.) Gas Lt. & Heating Co	1,682,750	100	88¼	89½
Preferred	3,026,500	100	107½	109
Consumers, Jersey City Bonds	600,000	1,000	103	106
Consumers, Toronto	1,700,000	50	218	225
Consolidated, Baltimore	11,000,000	100	.	70¼
Mortgage, 6's	3,600,000	..	..	118
Chesapeake, 1st 6's	1,000,000	..	..	..
Equitable, 1st 6's	910,000	..	..	..
Consolidated, 1st 5's	1,490 000	..	..	112
Consolidated Gas Co. of N.J.	1,000,000	100	15	17
" Con. Mtg. 5's	880,000	1,000	85	87
Consolidated G. & E. Co.'s.				
Little Falls, N.Y.	90,000	100	..	100
Bonds	75,000	..	..	100
Detroit City Gas Co	4,825,500	50	..	89
" Prior Lien 5's	5,603,000	1,000	99¼	100
Detroit Gas Co., 5's	981,000	1,000	77	79
" Inc. 5's	16,000	100	98½	100
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	..	101
Essex and Hudson Gas Co.	6,500,000	..	34	38
Fort Wayne	2,000,000	..	..	..
" Bonds	2,000,000	..	55	..
Grand Rapids Gas Lt. Co. 1st Mtg. 5's	1,225,000	1,000	104½	105
Hartford	750,000	25	245	265
Hudson County Gas Co., of New Jersey	10,500,000	..	25	..
" Bonds, 5's	10,500,000	..	101	103
Indianapolis	2,000,000	..	80	85
" Bonds, 6's	2,650,000	..	105	107
Jackson Gas Co	250,000	50	73	75
" 1st Mtg. 5's	290,000	1,000	101	102½
Kansas City Gas Light Co., of Missouri	5,000,000	100	..	36
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede, St. Louis	10,000,000	100	92½	99
Preferred	2,500,000	100	100	110
Bonds	10,000,000	1,000	109½	110
Lafayette Gas Co., Ind.	1,000,000	100		60
Bonds	1,000,000	1,000	60	65
Louisville	2,570,000	50	130	140
Madison Gas & Elec. Co.				
" 1st Mtg. 6's	350,000	1,000	107½	108½
" 6 per cent. scrip, due 1910	100,000	25	85	87
Montreal, Canada	2,000,000	100	218	184¾
Nashville Gas Lt. Co.	1,000,000	100	110	..
Newark, N. J., Con. Gas Co	6,000,000	..	56	58
Bonds, 6's	4,600,000	..	105	105¾
New Haven	1,000,000	25	300	325
Oakland, Cal.	2,000,000	..	46	47
" Bonds	750,000	..	..	.
Peoples G. L. & Coke Co., of Chicago	25,000,000	100	101¼	101⅜
Peoples Gas Lt. & Coke Co., Chicago, 1st Mortgage	20,100,000	1,000	..	..
2d "	2,500,000	1,000	104	
Rochester Gas & Elec. Co..	2,150,000	50	88	..
Preferred	2,150,000	50	118	..
Consolidated 5's	2,000,000	..	87½	90
San Francisco, Cal.	10,000,000	100	52¾	53
St. Joseph Gas Co.				
" 1st Mtg. 5's	751,000	1,000	95	96½
St. Paul Gas Light Co	1,500,000	100	45	47
1st Mortgage 6's	650,000	1,000	113	116
Extension, 6's	600,000	1,000	112½	115
General Mortgage, 5's	2,465,000	1,000	92	93
Syracuse, N. Y.	1,975,000	100	42	45
Bonds	2,047.000	1,000	98½	99½
Washington, D. C	2,600,000	20	410	411½
First mortgage 6's	600,000	..	..	..
Western, Milwaukee.				
Bonds, 5's	4,000,000	..	109½	110
Wilmington, Del.	600.000	50	232	..

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STOCKHOLDERS' MEETING.

OFFICE OF THE UNITED GAS IMPROVEMENT CO.,
N. W. CORNER BROAD AND ARCH STS.,
PHILADELPHIA, PA., February 27, 1903.

The Annual Meeting of the Stockholders of the United Gas Improvement Company will be held at the office of the Company, northwest corner of BROAD AND ARCH STS., PHILADELPHIA, on Monday, May 4, 1903, at 12 o'clock, noon, for the purposes of electing a President and six Directors, to serve for the ensuing year, considering and acting upon the subject of a proposed increase in the capital stock of the Company from 565,000 shares, of the par value of $50 each, to 734,500 shares, of the par value of $50 each, and transacting such other business as may properly come before the meeting.

The stock transfer books will be closed from 3 P.M., April 28, until 9 A.M., May 5th.

By order of the Board of Directors.

1448-8 LEWIS LILLIE, Secretary.

DIVIDEND NOTICE.

OFFICE OF THE UNITED GAS IMPROVEMENT CO.,
N. W. CORNER BROAD AND ARCH STS.,
PHILADELPHIA, PA., March 11, 1903.

The Directors have this day declared a quarterly dividend of 2 per cent. (one dollar per share), payable April 15th, 1903, to stockholders of record at the close of business, Mar. 31, 1903. Checks will be mailed.

1450-4 LEWIS LILLIE, Treasurer.

MISS LILY HAXWORTH,

Cooking Teacher and Lecturer,

(GOLD MEDALLIST),

Is open for engagements. For terms, etc.,

1441-3m Address 323 QUINCY ST., BROOKLYN, N. Y.

WANTED,

Position as Manager or Superintendent of Gas or Electric Interests.

Ten years' experience in construction, operation and management. Last 4 years in South.

1450-2 Address, "P. O. BOX 51," Jacksonville, Fla.

Position Wanted

AS MANAGER OF A GAS COMPANY.

By a man of 36. Fifteen years' experience in the management of coal and water gas plants. Can furnish good references. Address, "H. M. G.,"

1450-2 Care this Journal.

Situation Wanted

As Manager or Superintendent of a Coal Gas Plant.

Nine years' experience in plant construction, manufacture and distribution of coal gas, laying mains and services, handling gas stoves and fixture trade; also, piping houses and estimating cost of same. Good references.

1450-2 Address, "B. S.," care this Journal.

Position Wanted

BY A YOUNG MAN.

Sixteen Years' Experience in the Gas Business.

Thoroughly acquainted with the fuel end. Address,

1451-2 "J. W.," care this Journal.

SITUATION WANTED

As Manager of Coal Gas Plant

In town of 25,000 or less. Am now employed as manager of gas and electric light company, but have best of reasons for wishing to change. Address, "B. Z.,"

1447-5 Care this Journal.

WANTED,

A GAS SUPERINTENDENT.

A man under 45 years of age can secure a position as superintendent of a gas plant in a city of 30,000 inhabitants (putting out 60,000,000 cubic feet of gas per annum), if he is experienced and competent. The possibilities of the position will command the attention of any good gas man.

1447-tf Address, "B.," care this Journal.

WANTED,

WATER GAS MAKER.

A man competent to take charge of a small, Lowe water gas plant, in a growing town. Permanent situation for a good man. Give reference and age. Address,

1451-2 Address, "H. G.," care this Journal.

FOR SALE.

5-FOOT WATER GAS APPARATUS.

Address, CHARLES G. M. THOMAS,

1449-tf Flushing, N. Y.

APPARATUS FOR SALE.

Four 8 feet by 12 feet by 3 feet purifying boxes, with chain hoist, 8-inch dry center-seal; all valves and connections.

One 5-foot Harris Brothers' station meter, with valves and connections and bye-pass. All in good repair.

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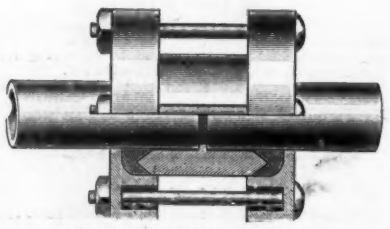

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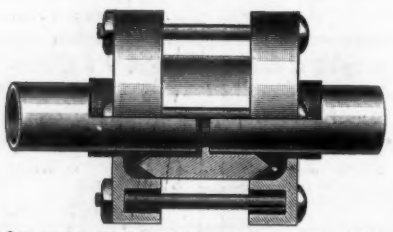

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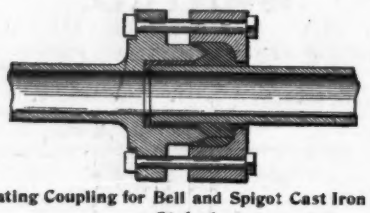

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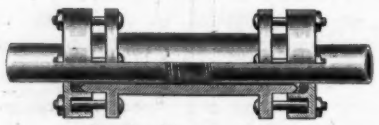

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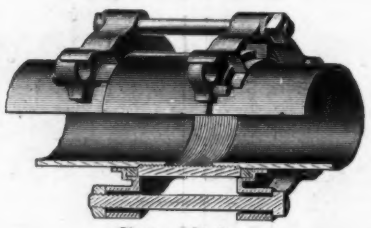

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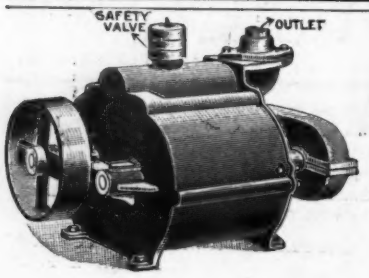

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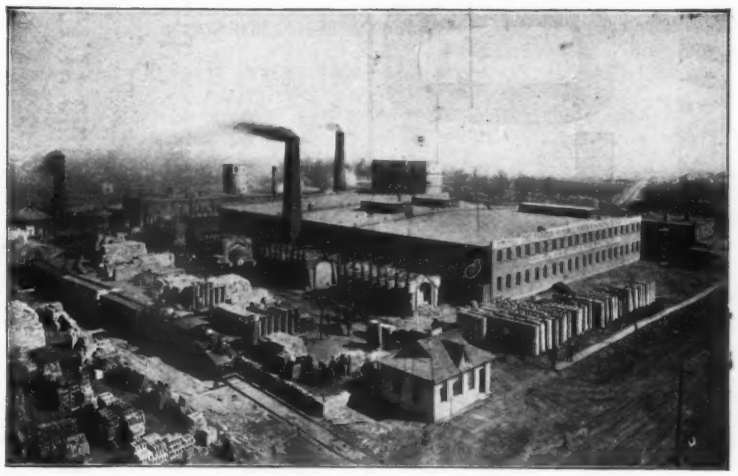

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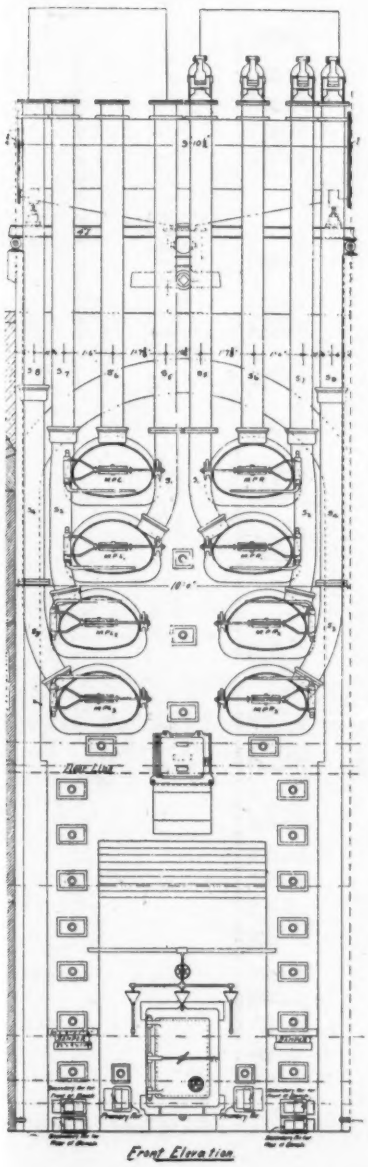

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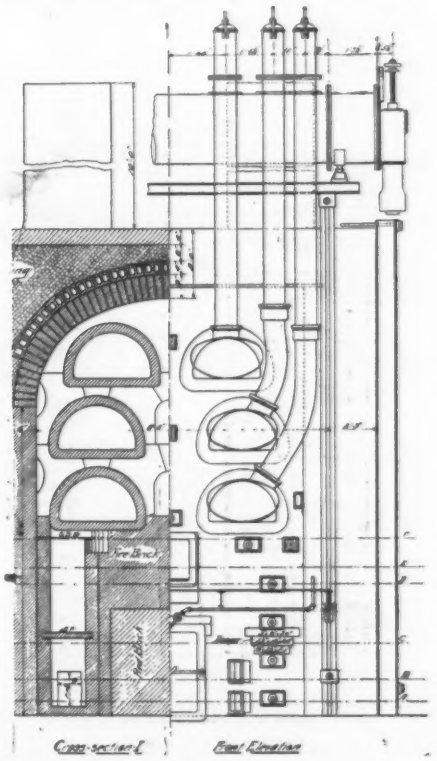

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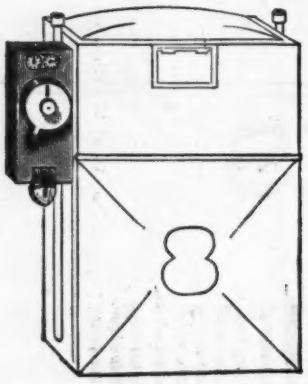

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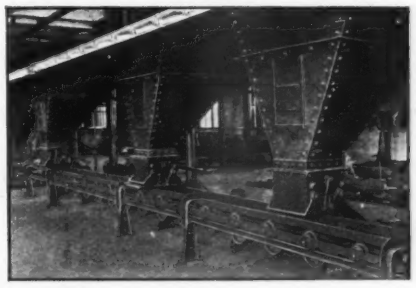

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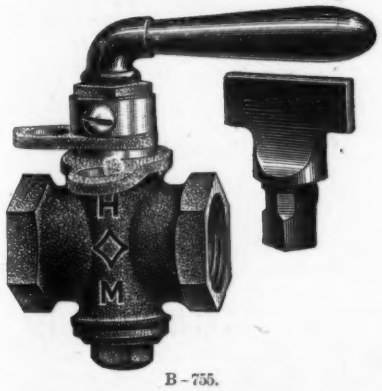

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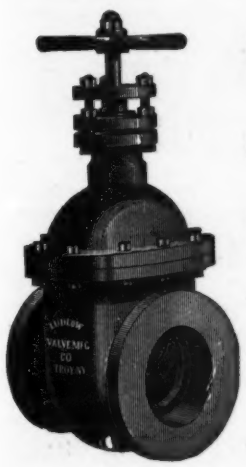

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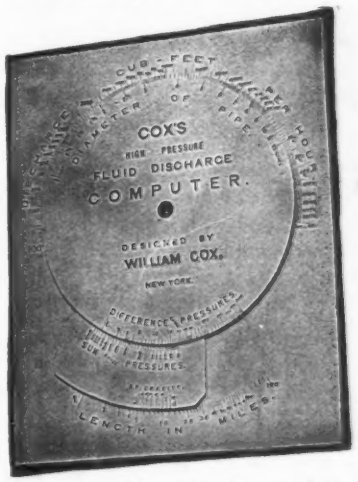

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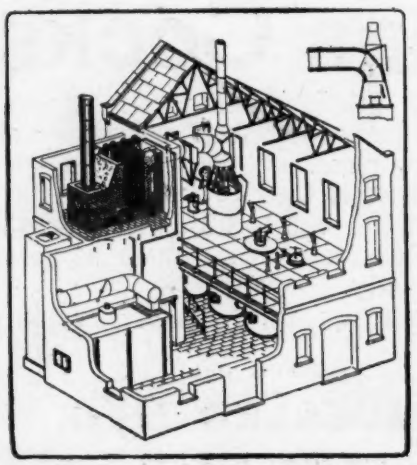

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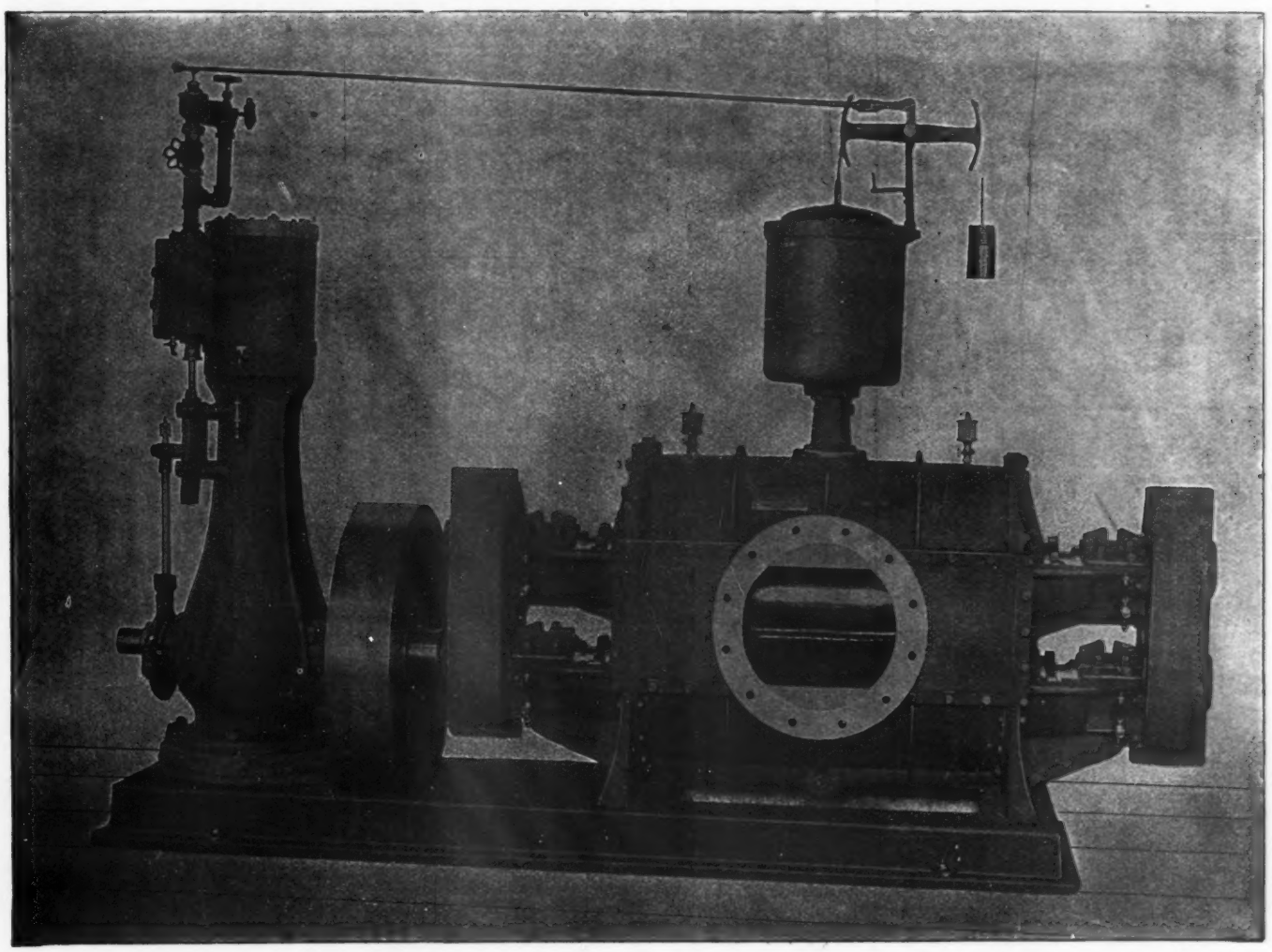

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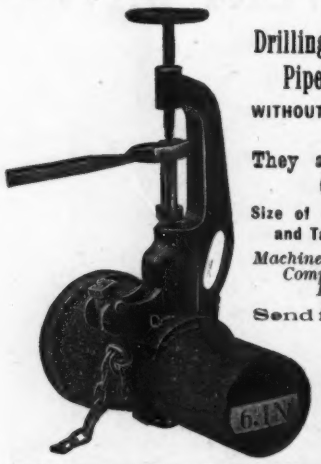

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PARSON'S TAR BURNER,

FOR USING COAL TAR AS FUEL.

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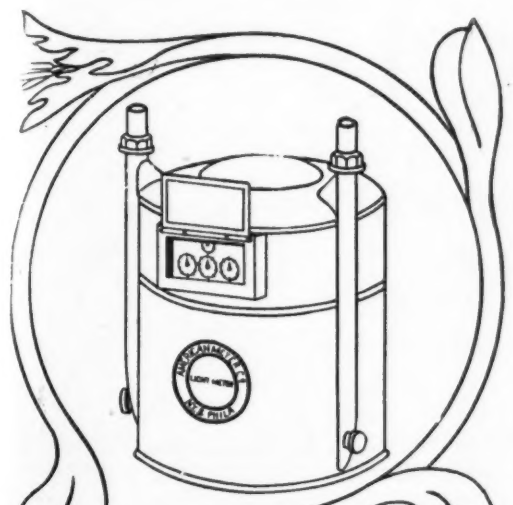
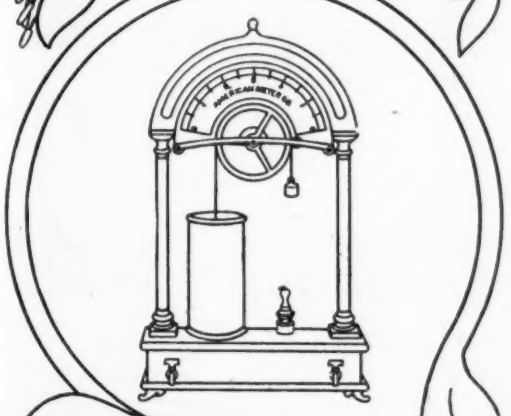
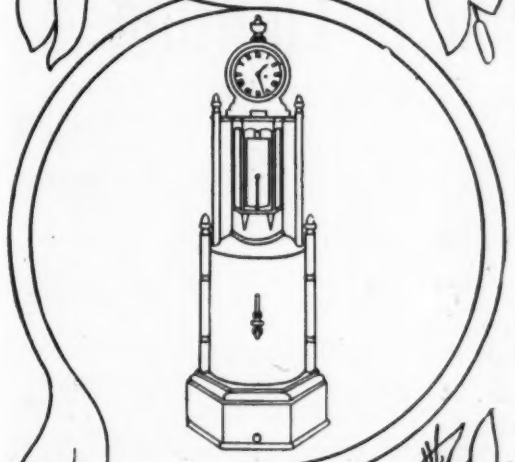
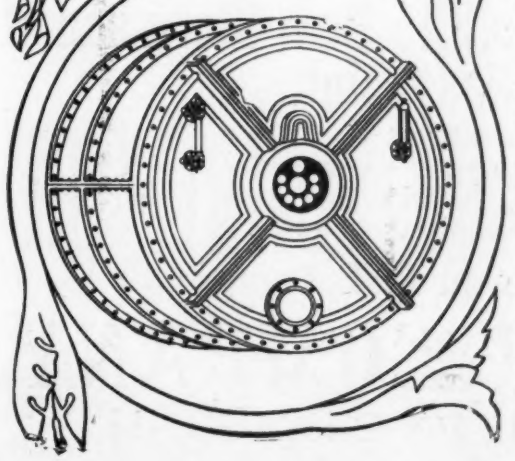








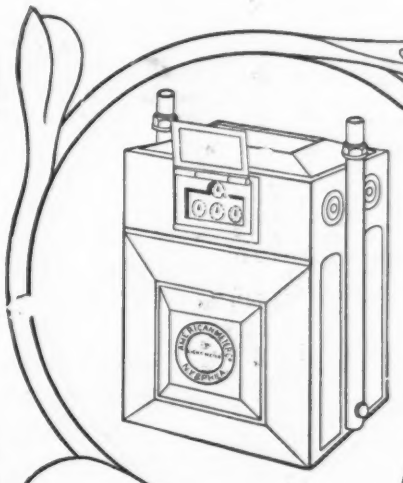
PUBLIC LIGHTING TABLE.

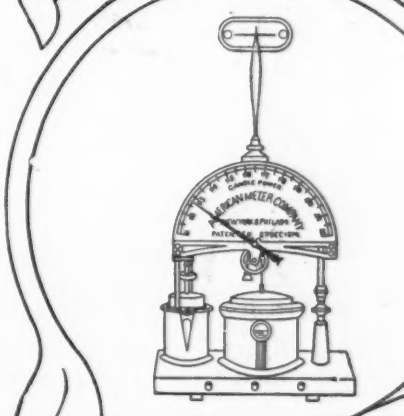
APRIL, 1903.

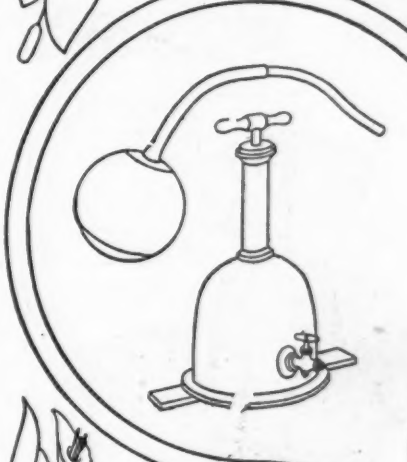
Day of Week.	Table No. 1. Following the Moon. Date.	Light.	Extinguish.	Table No. 2. New York City. All Night Lighting. Light.	Extinguish.
				P.M.	A.M.
Wed.	1	6.50 PM	4.50 AM	6.10	4.55
Thu.	2	10.30	4.50	6.15	4.40
Fri.	3	11.30	4.50	6.15	4.40
Sat.	4	12.20 AM	4.50	6.15	4.40
Sun.	5	1.10	4.40	6.15	4.40
Mon.	6	1.50	4.40	6.15	4.40
Tue.	7	2.30	4.40	6.15	4.40
Wed.	8	3.10	4.40	6.15	4.40
Thu.	9	3.40	4.40	6.25	4.30
Fri.	10	No L.	No L.	6.25	4 30
Sat.	11	No L. FM	No L.	6.25	4.30
Sun.	12	No L.	No L.	6.25	4.30
Mon.	13	7.10 PM	9.30 PM	6.25	4.30
Tue.	14	7 10	10.30	6.25	4.30
Wed.	15	7.10	11.20	6.25	4.30
Thu.	16	7.10	12.10 AM	6.30	4.20
Fri.	17	7.10	1.00	6.30	4.20
Sat.	18	7.10	1.40	6.30	4 20
Sun.	19	7.10 LQ	2.20	6.30	4.20
Mon.	20	7.10	2.50	6.30	4.20
Tue.	21	7.10	3.20	6.30	4.20
Wed.	22	7.10	4.00	6.30	4.20
Thu.	23	7.10	4.10	6.40	4.10
Fri.	24	7.10	4.10	6.40	4.10
Sat.	25	7.10	4.10	6.40	4.10
Sun.	26	7.20	4.10	6.40	4.10
Mon.	27	7.20 NM	4.10	6.40	4.10
Tue.	28	7.20	4.10	6.40	4.10
Wed.	29	7.20	4.10	6.40	4.10
Thu.	30	7.20	4.10	6.45	4.00

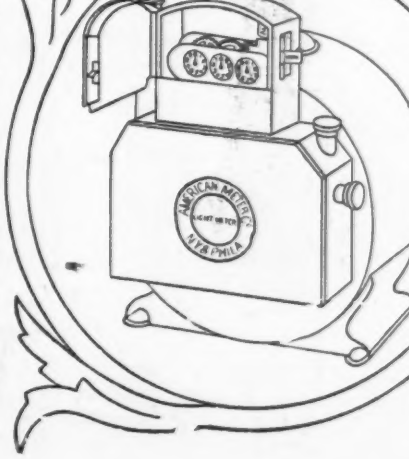
TOTAL HOURS LIGHTING DURING 1903.

By Table No. 1.	Hrs. Min.	By Table No. 2.	Hrs. Min.
January	245.00	January	423.20
February	192.00	February	355.25
March	201.00	March	355.35
April	167.20	April	298.50
May	152.00	May	264.50
June	131.00	June	234.25
July	140.40	July	243.45
August	156.20	August	280.25
September	171.20	September	321.15
October	198.20	October	374.30
November	216.30	November	401.40
December	232.10	December	433.45
Total, yr.	2203.40	Total, yr.	3987.45









NEW YORK, 33 Nassau Street. PHILADELPHIA, Broad and Arch Streets. CHICAGO, Foot of Orleans Street. BOSTON, 624 Tremont Building.
CLEVELAND, 809 Cuyahoga Building. ST. LOUIS, 712 Roe Building. SAN FRANCISCO, 712 Polk Street.

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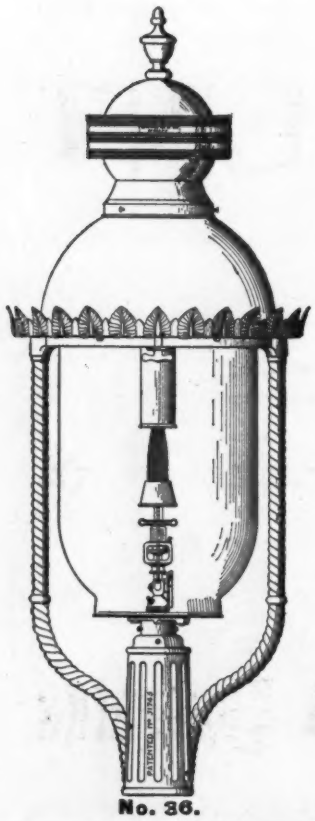
.... OF AMERICA ....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Controls and Operates the

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POINTS OF MERIT:

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IT LIGHTS THE STREET.

Where there are no gas mains we can furnish an equally good light by our SELF-GENERATING NAPHTHA WELSBACH BURNER, and thereby supply a uniform light in all localities.

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3. The greatest amount of candle power with least consumption of gas.
4. A by-pass cock so constructed as to permit all or only one mantle burning at a time.
5. A pilot light that consumes but 1 foot of gas in 24 hours. Costs $\frac{1}{10}$ of a cent a day.

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Let us send you one lamp—doesn't cost a fortune—and it will answer every question you put to it; make good on every test given it. You know the only proof of the pudding? What's the use in a fellow telling you it tastes good? Taste it yourself, then you know.

May we Send you ONE Lamp?

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During the Year 1902 has been Awarded Contracts in the Following Places for

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Belmar, N. J.	Indianapolis, Ind.	Oklahoma City, O. T.
Blue Island, Ills.	Jersey City, N. J.	Oneonta, N. Y.
Boonton, N. J.	Laconia, N. H.	Plainfield, N. J.
Brooklyn, N. Y.	Lakewood, N. J.	Portland, Me.
Carlisle, Pa.	La-Salle-Peru, Ills.	Pottsville, Pa.
Champaign, Ills.	Martinsville, Ind.	Scranton, Pa.
Coney Island, N. Y.	Memphis, Tenn.	South Brooklyn, N. Y.
Dallas, Tex.	Newark, N. J.	Suffern, N. Y.
Danville, Ills.	New Brunswick, N. J.	Swedesboro, N. J.
Des Moines, Ia.	New London, Conn.	Syracuse, N. Y.
Evanston, Ills.	New Orleans, La.	Washington, N. C.
Evansville, Ind.	Norfolk, Va.	Woonsocket, R. I.

TOTAL SETS, 1902, ... 51
TOTAL DAILY CAPACITY, 1902, . . 32,825,000 cubic feet.
TOTAL SETS TO DATE, ... 447
TOTAL DAILY CAPACITY, ... 299,670,000 cubic feet.

The United Gas Improvement Company,

Broad and Arch Streets, Philadelphia.

Established 1858. Incorporated 1890.
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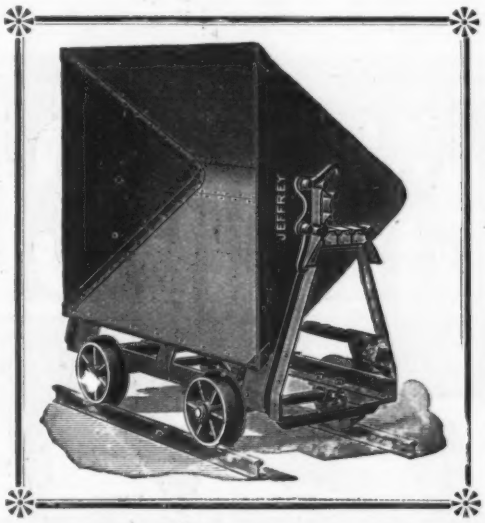

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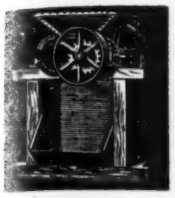

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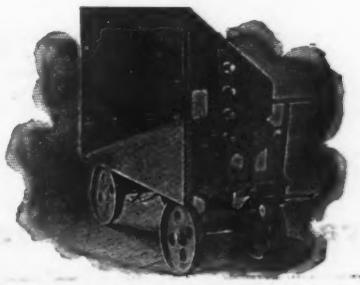

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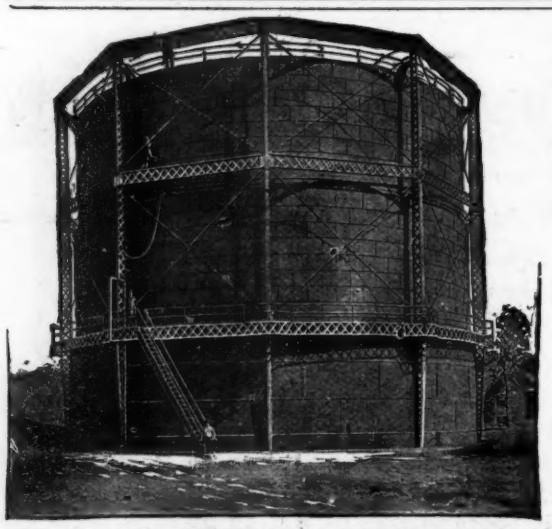

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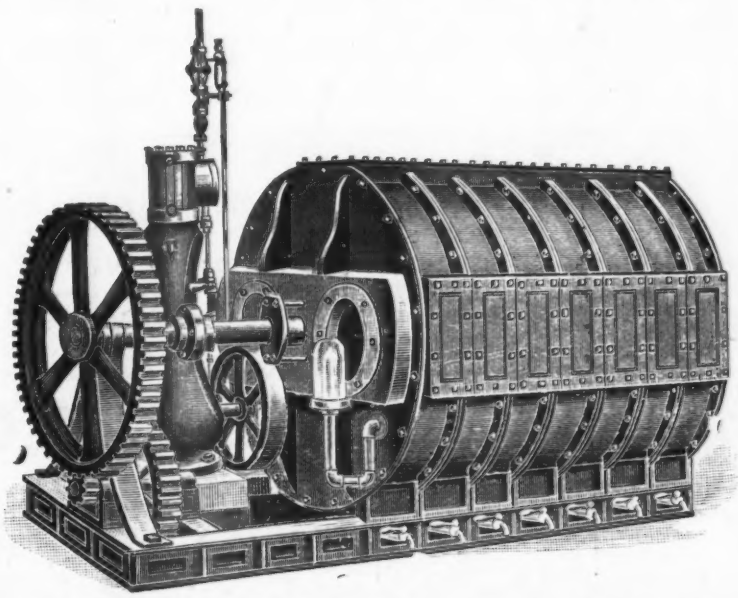

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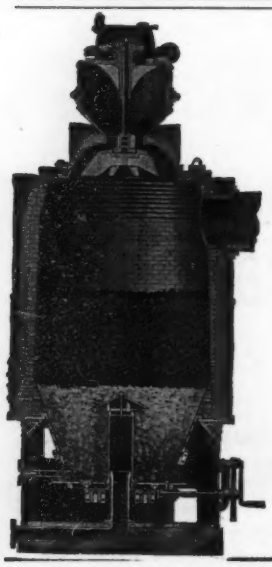

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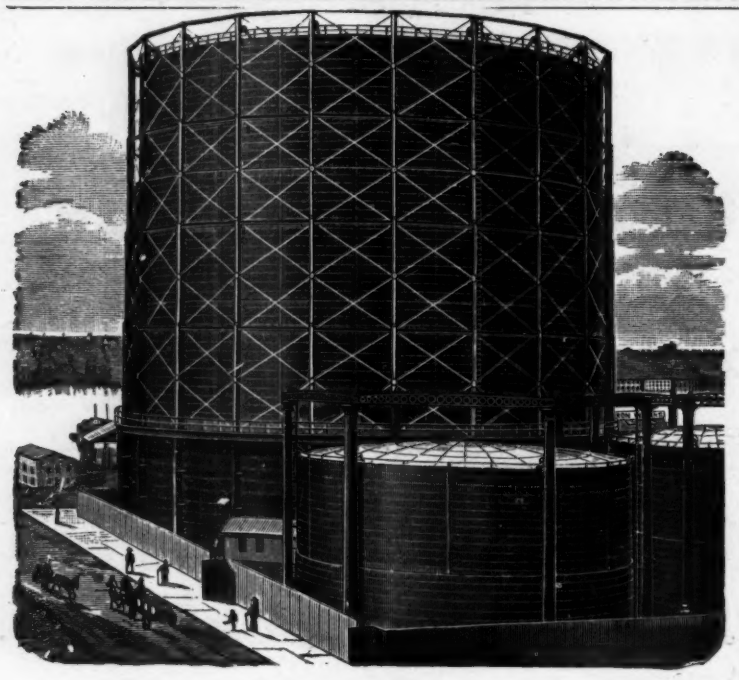

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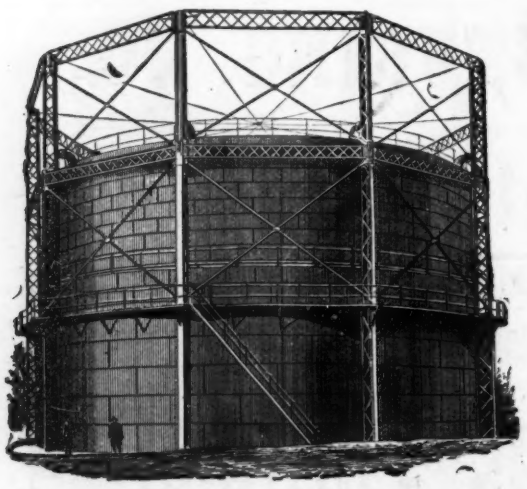

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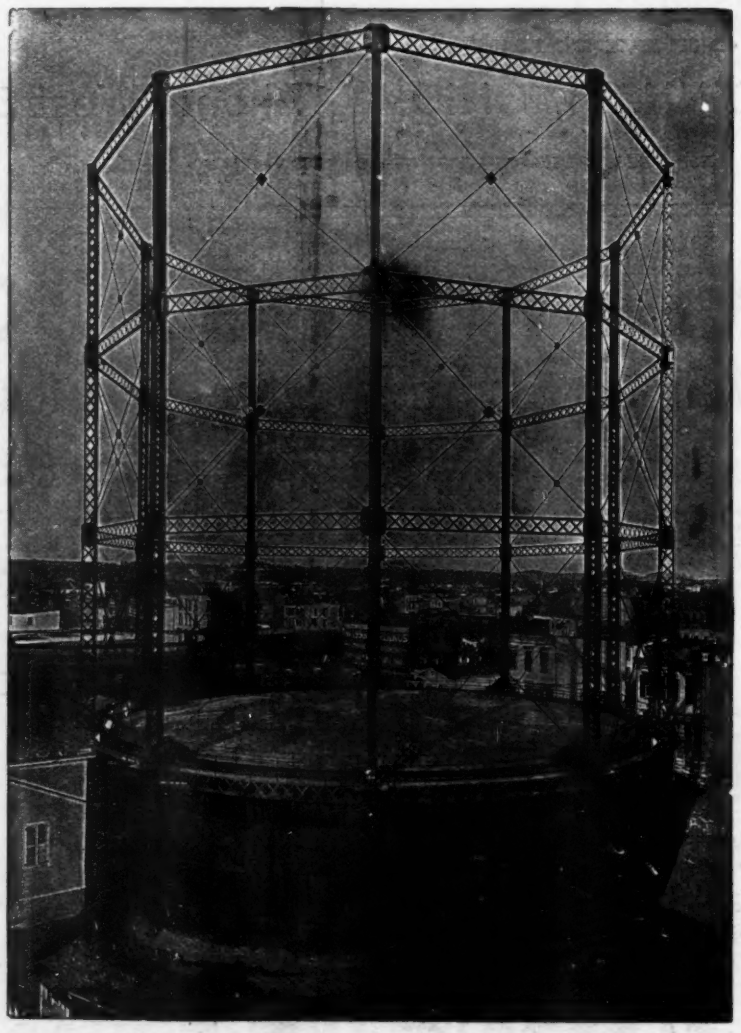

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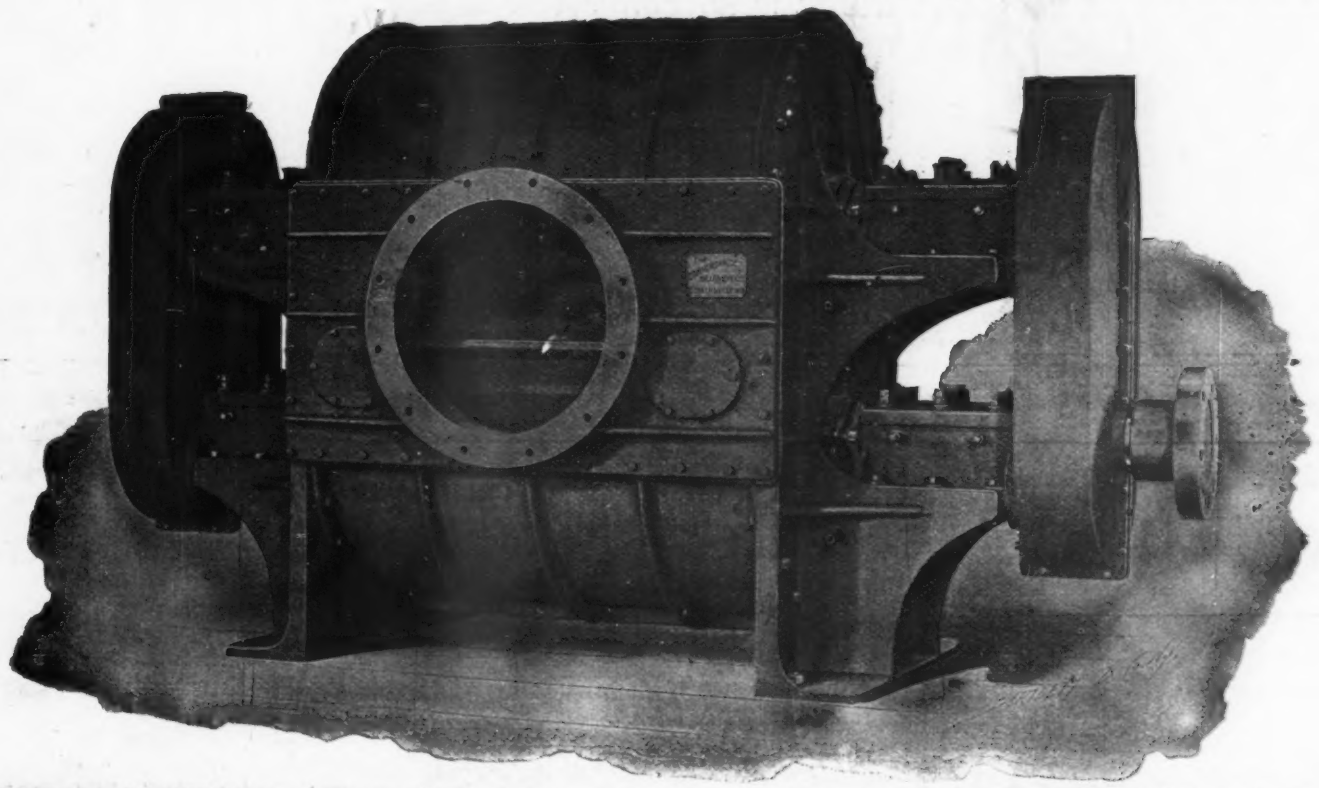

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